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Review of Pop-Up Messages on Electronic Gaming Machines as a Proposed Responsible Gambling Strategy

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Abstract Gambling revenue worldwide is increasing and associated increases in problem gambling heighten the need for effective responsible gambling strategies. This is particularly important for electronic gaming machines (EGMs), which are purported to make the largest contribution to problem gambling. In an attempt to increase the effectiveness of responsible gambling strategies, governments in Australia, New Zealand and Canada have supported the implementation of 'pop-up' messages on EGMs to break play and inform gamblers when they have been playing continuously for a set period of time. The purpose of this article is to review the evidence available regarding the efficacy of pop-up messages as a responsible gambling strategy for EGMs. While there is some evidence of the usefulness of these messages limitations remain to the known value of this strategy. Further research is needed to determine the optimal frequency of and content of pop-up messages, and the extent to which this method potentially minimises gambling-related harm.

Keywords Electronic gaming machines · Pop-up messages · Responsible gambling · Policy · Literature review

Despite the increased focus and efforts directed towards responsible gambling by the Government, Industry, and Community, gambling profit continues to increase. For example, electronic gaming machine (EGM) turnover in New South Wales (NSW) alone has increased by over five billion dollars in the past 5 years (Department of Gaming and Racing 2006). As research has demonstrated an associated increase in problem gambling with increased gaming expenditure (Lesieur and Blume 1990) there is a critical need for effective harm-minimisation interventions to be implemented. The introduction of the responsible gambling legislation has mandated several strategies to reduce the potential harm caused by

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EGMs, such as the use of signage on machines designed to inform players of the risks associated with gambling, and the provision of free 24-h gambling telephone support services, however, the effectiveness of these strategies remains unproven. For instance, while the turnover from EGMs increased from 2003 to 2005 in NSW, the number of calls made to G-Line, a help-line for gambling-related problems, decreased. This may not represent a decrease in problem gambling as problem gambling is often masked by other presenting problems or remains unreported. In a study of female problems gamblers it was found that 34% of the women ($n=50$) had been treated by mental health professionals in the past, but had never mentioned gambling to their therapist (Lesieur 1988) demonstrating that despite the problems associated with gambling, these may go unreported and untreated.

Studies indicate that 0.9–2.0% of adults experience serious gambling problems and an additional 2.0–3.7% have significant gambling problems, a prevalence rate that is largely consistent internationally (Productivity Commission 1999; Shaffer et al. 1999; Volberg et al. 1996). Superimposed on financial burdens, problem gambling has also been associated with employment and relationship problems, psychological and physical abuse and suicide (Lorenz and Yaffee 1986; Productivity Commission 1999). In addition to the individual burdens caused by gambling the Productivity Commission (1999) found the social costs related to excessive problem gambling range between $1,369 and $4,250 million per annum in Australia, with EGMs identified as the primary cause of gambling problems. Following these findings, a national audit of all responsible gambling programs found there was no available evidence supporting the efficacy of responsible gambling measures in place (Hing et al. 2001).

In an attempt to increase the effectiveness of responsible gambling strategies, some jurisdictions in Australia, New Zealand and Canada have implemented the proposal that EGMs display pop-up messages to advise players when they have been playing continuously for a set period of time. The planned introduction of pop-up messages is based on the conclusion that there is sufficient evidence for the introduction of this strategy for responsible gambling (Nova Scotia Gaming Corporation 2002; New South Wales Government 2005; Department of Internal Affairs 2005). The evidence this conclusion was based on came primarily from two studies, the first conducted in Nova Scotia, Canada examining changes to gaming machines over 9 months (Schellink and Schrans 2002) and the second was a laboratory study examining the effects of pop-up messages on the length of session play (Ladouceur and Sevigny 2003). The purpose of this article is to review the existing literature evaluating pop-up messages to examine the potential effectiveness of pop-up messages as a responsible gaming strategy.

One aim of responsible gambling strategies is to increase a player's ability to make informed choices regarding gambling by providing accurate, comprehensive, and easily available information. This is imperative in reducing problem gambling as the role of irrational cognitions and beliefs in the development, and maintenance of problem gambling behaviours has been well established (Blaszczynski 2000; Delfabbro and Winefield 2000; Ladouceur and Walker 1996). Cognitive-behavioural models argue that irrational cognitions may lead to greater expectancy of winning, acting to maintain and exacerbate gambling, and that these cognitive biases become automatic leading to a loss of control over gambling behaviour (Coulombe et al. 1992; McCusker and Gettings 1997). The substantive role of irrational cognitions in gambling behaviour is further evidenced by the success of cognitive therapy as the most effective treatment in management of pathological gambling (Sylvain et al. 1997).

The provision of accurate information to correct irrational cognitions during gambling has been investigated to determine its effectiveness as a responsible gambling strategy. One laboratory study showed that following the provision of accurate information regarding the

rules and nature of roulette, subjects were much more accurate in their estimations of winning, even correcting erroneous thoughts concerning probabilities prior to play, and did not play for as long as those given inaccurate information (Dixon 2000). Another laboratory study predicted that using signs to remind gamblers about the independence of chance events would reduce erroneous perceptions and motivation to continue playing (Benhsain et al. 2003).These signs, displayed on computer screens during a game of electronic roulette, significantly reduced erroneous verbalisations and participants exposed to these signs opted to continue to play significantly less often than control participants. While these studies are limited in the extent to which the findings can be generalised to real-world settings, they provide some support for the use of informative messages to modify player's behaviour by correcting irrational thoughts.

Previously mandated responsible gambling strategies included the use of static signage, containing information detailing probabilities of winning and the possible risks associated with gambling, with the intent to provide gamblers with sufficient information to allow full-informed choice in decision making. However, the basis for this legislation was not founded on empirical data supporting the effectiveness of such notices influencing gambling-related thoughts and behaviour, but extrapolated to gambling from warning signs used in other public health areas such as smoking and alcohol consumption. Research on alcohol and tobacco health warning labels suggests that warning may increase consumer awareness of labels, but not changes in perceived risks of hazards involved or consumer behaviour (Krugman et al. 1994; Stockley 2001). Consistent with the literature on tobacco and alcohol, studies show some evidence that individuals are aware of, and recall messages placed on EGMs, but these are generally ineffective in changing player's thinking and gambling behaviour (Hing 2003). In one study (Focal Research 2004), 25 to 33% of participants reported that they failed to notice displayed signs.

Consequentially, warning signs for EGMs have been designed to be more effective by capturing player attention in the presence of competing stimuli. One such method is a periodic information message displayed on EGM screens in order to create a break in play and potentially encourage players to actively decide to continue or discontinue their gambling session, commonly referred to as 'pop-up' messages. Research has shown that secondary displays interrupting primary tasks and captivating attentional focus, affect performance on primary tasks for longer than the time they are presented, suggesting that they may have a longer lasting affect on cognitions (Bailey et al. 2001). A laboratory study involving 187 university students playing modified EGMs found that participants recalled translucent, dynamic messages scrolling across the EGM screens to a significantly greater extent than government-mandated static messages (Monaghan 2004) demonstrating the increased efficacy of dynamic messages as a responsible gambling initiative.

Several studies have been conducted evaluating the efficacy of pop-up messages as a responsible gambling strategy. One study investigated the effect of modifications made to 1,400 EGMs in Nova Scotia, Canada, including the introduction of a pop-up reminder that froze play for 15 s advising the player of how long they had been playing after 60, 90, and 120 min intervals and asking them if they wished to continue (Schellink and Schrans 2002). This study was based on a sample size of 164 regular gamblers, who played EGMs at least monthly, and included 30 individuals classified as problem players. This group of people were surveyed four times over a period of 9 months.

Exposure to the 60-min pop-up message was associated with a small reduction in session length and a decrease in expenditure among high-risk players (Schellink and Schrans 2002). Further messages at 90 and 120 min were not effective, but earlier messages at 30 min increased exposure to the pop-up reminders and appeared to reach more players. Players

exposed to messages every 30 min were significantly more likely to report seeing any pop-up messages compared to players exposed to messages every 60 min. For high-risk players, frequency of seeing the 30 min pop-up message was associated with a decline in the frequency of exceeding budgets set for play. However, the message appeared to have limited impact on players as nearly half the participants reported they never read the text before selecting their answer and almost every player reported that they always selected 'Yes' indicating they understood and wished to continue, and continued to play. Of the players exposed to the pop-up messages only 25% felt that the pop-up reminders would have a positive effect in terms of keeping track of time or money while playing (Schellink and Schrans 2002).

The second major study supporting the implementation of pop-up messages was a laboratory study investigating the effect of pop-up messages and breaks in play using a sample of 30 people (Ladouceur and Sevigny 2003). In this study participants were randomly allocated to be exposed to either messages reminding participants that the outcome of the game is determined by chance, which appeared for 7 s on the screen of EGMs every 15 trials causing a break in play, a blank message breaking play, or no break in play. It was found that participants played significantly fewer games when exposed to either messages or breaks in play as compared to the control group, but there were no differences between the number of games played in those exposed to messages or just breaks in play. These results have been taken to support the use of pop-up messages and breaks in play to modify problem gambling behaviour.

While both these studies provide support for the use of pop-up messages and breaks in play as a method to modify gambling behaviour, they are limited in the extent of evidence they provide and how the results found can be generalised to the wider gambling community. In evaluating the effect of introducing new EGMs in Nova Scotia (Schellink and Schrans 2002), only 75 players were interviewed to determine the effect of pop-up messages, representing 46% of the total sample (N=164). This was in part caused by a drop-out rate of 30.8% across the study and the higher percentage of players who chose to continue to play on the older, unmodified EGMs. This small sample size limits the power and external validity of the findings, as the results obtained may not be the same as those obtained in a different or larger population. It also suggests that the majority of players preferred to play on the unmodified machines, while reasons for this were not explored, the response of players to the modified machines once the option to play on unmodified machines is no longer available has not been evaluated.

Furthermore, results were obtained based on player self-report which may not be an accurate measure of player behaviour. Self-report of high-risk behaviour is often underreported, for example in a study examining the accuracy of self-report of alcohol-offenders a significant number underreported the severity of their drinking and problems caused by drinking (Nevitt and Lundak 2005). This effect may be increased in gamblers as studies have frequently found problem EGM players often report feeling as if they are oblivious to their surroundings when playing, as well as losing track of time when gambling and spending more time and money than intended (Wynne 1994). This limits the extent to which self-reports of reduced session length associated with pop-up messages can be supported, especially given the small level of change.

These limitations could be overcome by including an investigation of the mechanism of change by which pop-up messages affect behaviour. The gambler's thoughts were not directly measured and so it is unclear what process occurred resulting in the reduction in session length. The premise behind reminding gamblers how long they had been playing was to assist the player in managing the amount of time and money spent while playing by

creating a break in play and providing a reality check for the player. However, whether this was the mechanism causing the reduction in session length for players exposed to the 60 min messages remains unclear.

In regards to the study conducted by Ladouceur and Sevigny (2003) the conclusions that can be drawn are also limited by methodological concerns. The sample size consisted of only 30 people and the method of recruitment is not stated, which limits the extent to which any results may be generalised to other populations. Furthermore, the level of gambling pathology in the sample was not described, although it was stated that participants reported playing EGMs between once and four times a month. Therefore, it is unclear how the pop-up messages and breaks examined would affect other gamblers. The participants were exposed to messages every 15 trials, a much greater frequency than the 60 min interval proposed as effective by the Nova Scotia study (Schellink and Schrans 2002). While the short interval between pop-up messages may increase its effectiveness in terms of level of player exposure to the message, other factors were not investigated such as whether the player found the message irritating or distracting, and whether these factors could account for shorter play duration. In a laboratory study involving 187 participants, half of which were exposed to dynamic messages scrolling across a screen at intervals of 3 min during play, allowing play to continue throughout, 3% reported they found the signs distracting (Monaghan 2004). As the pop-up messages involved in Ladouceur and Sevigny's (2003) study occurred much more frequently and imposed a break in play it is possible these signs were considered distracting.

The study also used an artificial environment so it cannot be determined how players would respond to the pop-up messages and breaks in a true gambling environment. Conditions imposed include a regulated win-loss sequence, controls for risk-taking and limits to the total session of play, thereby limiting the amount of money which was possible to win. All these factors may change how pop-up messages are perceived and effect players and how players think and behave. Therefore, while the study provides important initial information regarding the effectiveness of pop-up messages and breaks in play, this information is only a guide for how the same conditions would affect gamblers in a real-life scenario.

Importantly, there were no differences found between players exposed to informative messages and breaks in play without information displayed. Ladouceur and Sevigny (2003) propose that the break may create an opportunity for the player to distance themselves from the game and to re-evaluate their behaviour; however, as they did not include any measure of participant's cognitions, the exact effect of the different components of the message and break remains unknown.

Another unexplained finding arising from this study is the extremely high standard deviations for the number of games played found in the message (M=136.2, SD=64.1) and break (M=137.8, SD=73.4) group, compared to low standard deviations found in the control group (M=197.2, SD=8.85; Ladouceur and Sevigny 2003). The findings show a high level of variability in the players in the message and break groups for the number of sessions played as compared to the relative consistency seen in session length for the control group. This suggests that the lower mean session length found for the two experimental conditions could be a result of a few participants playing for a shorter time, rather than the message and break causing all players to reduce their session lengths. Since the pop-up and break conditions appear to affect different players in different ways the mechanism by which these conditions may reduce sessions of play requires further investigation.

Two further studies have been conducted assessing the use of warning messages to modify gambling beliefs and behaviour. The first by Floyd et al. (2006) involved 122 university students who had gambled previously, with the demographic information provided

suggesting each individual gambled less than once a month. This study improved on past research with the inclusion of several measures of gambling-related beliefs as well as a measure of the participant's experience during play. Participants were randomly allocated to one of two conditions; in the experimental condition participants viewed an educational film discussing common irrational beliefs, while the control group watched a video on the history of roulette. Participants were then given up to 40 min to play an electronic version of roulette in a simulated gaming environment, after which they could exchange any remaining credits for raffle tickets. During play participants in the experimental condition were exposed to pop-up messages displayed on the computer screen ever three to six spins displaying messages explaining the game was due to chance, could not be influenced, and continued play would result in losses. These messages could be removed by clicking an 'OK' button.

Results found that participants in the warning message group reported fewer irrational beliefs about gambling and finished their sessions with significantly more money remaining. The messages did not appear to compromise the participant's experience of play and participants reported reading an average of 81% of the messages displayed. These findings were taken by the authors to support the conclusion that exposure to informative pop-up messages results in fewer gambling-related irrational beliefs and play in a more controlled manner.

While this study improves on many of the limitations of previous research, it is still limited in the evidence it provides for the use of pop-up messages as a responsible gambling strategy. Again, the number of subjects was relatively small, and they were taken from a university sample, which did not appear to include regular gamblers and the study was conducted in a laboratory. This limits the extent to which the same results would be found in a sample of regular gamblers in a real gambling environment. They did not evaluate whether breaks in play had any effect on thoughts or behaviour as compared to breaks with the inclusion of messages, so the mechanism that affects cognitions and play cannot be determined. While they found that in the pop-up message condition players finished with more credits, there were no significant differences in the number of spins or the general level of risk taken between groups so it is unclear in what way the behaviour of individuals changed to produce the apparent increase in control over gambling behaviour. In addition, the conditions imposed on participants were fairly artificial in that the experimental group was shown an informative video prior to play discussing irrational beliefs, a condition that would not exist in the real world. It is possible that this condition contributed to the changes seen in cognitions and behaviour, rather than these changes caused by exposure to the pop-up messages. The high frequency of message exposure, occurring approximately ever six spins, is also unrealistic as a method to be implemented in a real gambling scenario as the proposed message frequencies are 30 and 60 min intervals (Nova Scotia Gaming Corporation 2002; New South Wales Government 2005; Department of Internal Affairs 2005).

One final study evaluating pop-up messages and breaks in play as viable responsible gambling tools included 40 undergraduate students who scored highly on a measure of illusions of control (Cloutier et al. 2006). Participants played EGMs in a simulated gaming setting and those in the experimental condition were exposed to an introductory message containing information regarding the nature of the game as one of chance. During play pop-up messages appeared on the screen containing messages that lasted for 7 s informing the player that outcomes are determined by chance, and cannot be influenced in any way. In the control group players did not see an introductory message and instead of informative messages saw pop-up signs containing the word "Pause" on the EGM screen. Participants completed a measure of irrational beliefs before and after play to assess any changes in cognitions.

Results found that the participants exposed to the informative messages reported a lower degree of erroneous perceptions than the pauses group, although there was also a significant decrease in strength of erroneous believes between pre- and post-test in the pauses group. There were no differences found between groups in the number of games played, replicating the results of Ladouceur and Sevigny's (2003) earlier study. The sample, although small and from an undergraduate university population was estimated to contain a mixture of low-risk, at-risk, and possible problem gamblers, which allows a better estimation of how different groups of gamblers may react to the pop-up messages. However, as in the study conducted by Floyd et al. (2006) there is no way to determine the degree to which irrational cognitions were affected by the introductory informative message and the pop-up messages as both were presented in the same condition. Furthermore, as there is no control condition that played without exposure to breaks or messages, there is no evidence to suggest that irrational cognitions were not affected simply by the session of play.

Despite the limitations of the available evidence, there is support for the introduction of pop-up messages including a break in play as a responsible gambling strategy that may modify gambling-related cognitions and behaviour. Several questions remain unanswered with regards to the optimal message to be implemented. Studies have investigated a range of effective message frequencies ranging from every six games to every 60 min of play. A compromise must be reached to minimise interference for recreational gamblers, while ensuring sufficient exposure to messages to facilitate an influence gambling behaviour. As it is difficult to track "total time played" on machines in the absence of a central monitoring system for EGMs it is proposed that pop-up messages should be displayed at least every 30 min, a rate that has shown to have some success in alerting players to time and money spend playing (Schellink and Schrans 2002) and possibly more frequently to have a maximum impact as a responsible gambling strategy.

The optimal content of messages also remains unknown and is suggested as an area for future research. To date, the effect of reminding players of time spent on cognitions during play remains untested. At the present time in NSW there is no central tracking system among EGMs that would allow an individual player to be tracked between machines and sessions. Therefore, if a machine reaches zero credits, a break is taken in play, or a player changes machines during a session of play, the EGM would reset and the specified level must be reached for what the EGM would see as a new session of play before the pop-up message is triggered. This means that individuals may play for extended sessions without being exposed to pop-up messages. Research conducted by the University of Sydney's Gambling Research Unit (Blaszczynski et al. 2001) assessed the gambling behaviour of 779 participants from clubs and hotels. Using observation they found the average time recreational gamblers played for one session was less than 30 min (M=28.8, SD=35.8) while problem gamblers played on average for 41.6 min (SD=31.7). During this time recreational gamblers played an average of 2.24 machines (SD=3.76) and problem gamblers played an average of 2.12 machines (SD=3.13). These results demonstrate that players do not play one machine consistently for periods of 60 min, so a pop-up message triggered by 60 min of play would not be the most effective tool for encouraging responsible gambling. Furthermore, if an individual did reach 60 min of play on one machine, a pop-up message stating this may be underestimating the total amount of time spent gambling, and so provides inaccurate information that may encourage further gambling behaviour.

Research has supported the use of informative messages targeting common irrational beliefs relating to illusions of control in the modification or gambling-related irrational cognitions (Floyd et al. 2006; Cloutier et al. 2006). While these results cannot be distinguished from the effects of an informative message shown to players prior to the session of

play and the effect of enforced breaks in play, the use of informative messages specifically targeting common irrational cognitions found in gambling is thought to be an effective harm-minimisation mechanism in facilitating informed choice.

Due to the limitations of the current research examining the effect of pop-up messages as a responsible gambling strategy further research is needed. It is recommended that both laboratory and field studies be carried out to investigate the optimal content and frequency of messages that will modify irrational beliefs by providing correct, informative messages facilitating informed choice. In this way, pop-up messages including breaks in play may be supported by empirical evidence as an effective responsible gambling initiative.

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