

**Responsible gaming messages on simulated electronic gaming machines:
Preliminary results of a study examining impact on recall, cognitions and
behaviour**

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Abstract

The purpose of the current research was to evaluate the effectiveness of pop-up responsible gambling displayed on electronic gaming machines (EGMs). Messages designed to correct commonly held cognitive distortions were compared to existing government mandated messages. The objective was to assess differences in the display of signs and their content on recall, self-appraisal, and effects on thoughts and behaviour. The aim was to determine if messages encouraging self-appraisal of gambling behaviour were effective in influencing gambling-related cognitions and behaviour, as measured by recall of content, frequency and duration of play, and net expenditure.

Participants were n = 84 regular EGM players recruited from an undergraduate university population. Participants attended an experimental session where they completed a battery of questionnaires evaluating gambling behaviours and related beliefs. Participants played computer-simulated gaming machines configured to display either pop-up messages on the screen imposing a forced break in play, or a static sign located adjacent to the machine's screen. The content of the signs was manipulated to include messages designed to increase knowledge of the odds of winning and how outcomes are determined, or to encourage self-awareness during play, and a blank sign used as a control message. Recall of signs and effect on participant's thoughts and behaviour were measured using post-test and follow-up questionnaires. Results indicated that pop-up messages combined with self-appraisal messages are more effective in influencing gambling thoughts and behaviour than messages conveying simple information on probabilities of winning. This research can be used to inform key stakeholders and policy decision makers on the most efficient method of delivering responsible gambling messages to inform and better protect gamblers from gambling related harm.

Introduction

Gambling is a popular recreational activity with estimates suggesting that 82% of Australians play at least one form of gambling each year (Australian Gaming Council, AGC, 2007) with a total gambling expenditure in 2004 to 2005 of \$16.9 billion dollars (AGC, 2007). Electronic gaming machines (EGMs) are the second most popular form of gambling, played by 39% of adults, and accounting for 60% (\$10.1 billion) of all gambling expenditure in 2004-2005 (AGC, 2007). Over one-fifth of the total EGMs in the world are located in Australia (Productivity Commission, 1999), with Australian EGMs among the most sophisticated in the world: rapid playing speeds and payout intervals, bank note acceptors, options to play multiple credits and multiples lines of play, a range of machine denominations, credited wins and progressive linked jackpots (Dowling, Smith, & Thomas, 2005).

A national epidemiological survey found that approximately 2.3% of adults have significant gambling-related problems (Productivity Commission, 1999). Gambling causes considerable distress to individuals and families: financial burdens, relationship breakdowns, co-morbid substance abuse and depression (Productivity Commission, 1999). Annual social costs related to problem gambling that include health care, reduced economic productivity, crime and bankruptcies estimated to range between \$1.4-\$4.3 million dollars (Productivity Commission, 1999). EGMs have been identified as the primary form of gambling related to problems as evidenced by the finding that 70% of gamblers in treatment report problems with this form (Productivity Commission, 1999).

In response, Government, Industry and Community stakeholders have begun implementing responsible gambling strategies. Responsible gambling programs are based on the premise that the ultimate decision to gamble remains the responsibility of the individuals, and to properly make the decision to gamble individuals must have the opportunity to be fully informed (Blaszczynski, Ladouceur, & Schaffer, 2004). Informed choice measures target all community members participating in gambling and aim to increase individual awareness of the risks and possible consequences of gambling through the provision of accurate, timely and complete information. These measures endeavour to assist people in making informed decisions regarding the extent of their gambling. However, the basis for this legislation is not founded on empirical data supporting the effectiveness of such signs but extrapolated to gambling from warning/information signs implemented in other public health domains, for example, smoking and alcohol consumption.

It has been widely accepted that irrational cognitions, including superstitious beliefs, illusions of control and misunderstanding the random and independent nature of outcomes, play a central role in problem gambling behaviour by leading to a greater expectancy of winning, acting to maintain and exacerbate gambling (Walker, 1992). Based on this cognitive model of gambling, the use of signage as a responsible gambling strategy aims to modify these irrational thoughts and beliefs by providing players with correct information on how EGMs function and the probabilities of winning to allow full-informed decision making.

Cognitive therapy aims to teach individuals to challenge irrational beliefs about gambling, and has been shown to be the most effective treatment in the management

of pathological gambling (Sylvain, Ladouceur, & Boisvert, 1997). Laboratory studies have demonstrated that exposing people to correct information increases individual's accurate estimations of winning and modifies in-session gambling behaviour (Dixon, 2000; Benhsain, Taillerfer, & Ladouceur, 2004). Accordingly, displaying signs on EGMs informing players of accurate gambling-related facts should increase knowledge and understanding of probabilities of winning and reduce irrational cognitions during gambling and subsequently modify gambling behaviour. Targeting gambling-related irrational beliefs, harm-minimisation strategies may produce a greater impact on a greater proportion of gamblers; at risk, probable problem gambling, and problem gambling across a general population.

However, the extent to which the effects and results of individual therapy and laboratory studies can be generalised to signage aimed at the wider population is limited. In a survey designed to assess member awareness, perceived adequacy and perceived effectiveness of responsible gambling strategies in Sydney clubs, over 67% of respondents indicated they noticed signs relating to chances of winning major prizes on EGMs, but this was shown to be generally ineffective (Hing, 2003). In another study (Focal Research, 2004), 25% to 33% of participants reported failure to notice displayed warning signs placed on EGMs. Furthermore, a national audit of all responsible gambling programs required by legislation found there was no available evidence supporting the efficacy of responsible gambling measures in place (Hing, Dickerson, & Mackellar, 2001).

A number of recent studies have questioned the effectiveness of providing information in modifying gambling behaviour. Individuals, although aware of the

nature of randomness and probabilities, appear to set aside their rational thinking during actual gambling sessions (Benhsain, et. al., 2004). Additionally, interventions that increase participant's understanding of gambling odds and awareness of irrational beliefs have been found to be unsuccessful in modifying gambling behaviour (Steenbergh, Whelan, Meyers, May, and Floyd, 2004; Williams & Connolly, 2006). These findings suggest that simply providing player information is ineffective in modifying behaviour. Moreover, May, Whelan, Meyers and Steenbergh (2005) found that reduction in gambling-related irrational beliefs did not result in any changes to gambling behaviour suggesting that irrational beliefs may not cause risky gambling behaviour as previously believed and that the theoretical basis of current responsible gambling strategies should be re-examined.

There is a need to evaluate the content and most efficient method of presenting signs to maximize positive changes in gambling attitudes and behaviours. Previous research conducted in our laboratory (Monaghan & Blaszczynski, 2007) found improved recall of information and changes in cognitions following presentation of messages in the form of a dynamic translucent display scrolling across the screen of an EGM as compared to static signs mandated by the New South Wales (NSW) Government. The results imply that this sign made significant improvements in capturing and maintaining attention as well as effectively communicating information resulting in greater comprehension of the message. These findings suggest that dynamic displays provide an effective mechanism for allowing informed choice in responsible gambling strategies.

Following findings of the limited effectiveness of current responsible gambling strategies, the NSW Government concluded that there is sufficient evidence for the introduction of pop-up messages, which would appear on EGM screens during a forced break in play, and supported this recommendation made by the Independent Pricing and Regulatory Tribunal (IPART, 2004; NSW Government, 2005). Exposure to pop-up messages and breaks in play has been associated with reduction in session length and a decrease in gambling expenditure as well as a decrease in gambling-related irrational beliefs and erroneous perceptions (Schellink & Schrans, 2002; Ladouceur & Sevigny, 2003; Floyd, Whelan, and Meyers, 2006; Cloutier, Ladouceur, & Sevigny, 2006).

Research suggests that simply informing players about the risks associated with given behaviours, does not necessarily result in modification of behaviour (Engs, 1989). To control their behaviour, individuals must monitor their actions to evaluate whether they are on track and if further self-regulatory effort is needed. Studies have demonstrated that self-monitoring is generally associated with behavioural change, typically in the desired direction, that is, problem behaviours typically decrease when self-counted, while desired ones become more frequent (Nelson, 1977; Bellack, Rozencski, & Schwartz, 1974; Broden, Hall, & Mitts, 1971). Messages encouraging gamblers to monitor their behaviour and compare it to their own expectations may assist individuals in making informed decisions.

The aim of the current study was to investigate the differential extent to which gamblers recall pop-up messages as compared to government mandated static signs on EGMs, and the effectiveness of such strategies in modifying irrational cognitions

and intent to play. The specific objective was to determine the extent to which gamblers can recall information freely and in response to prompted cues, and whether modifying the content and mode of delivery of information contained in signs leads to improved recall, corrected irrational cognitions, and greater intent to engage in responsible gambling behaviours. The empirical data will guide policy decision-makers in enhancing current regulatory requirements designed to improve player information and informed choice.

The following hypotheses were tested:

1. That pop-up messages delivered on the screen of a simulated EGM during play will result in:
 - a. greater recall of the message
 - b. greater effect on gambling-related thoughts and behaviour and
 - c. greater reported influence on real EGM play than messages delivered on standard static displays.
2. That messages encouraging self-appraisal will result in:
 - a. greater effect on gambling-related thoughts and behaviour and
 - b. greater reported influence on real EGM play, than other messages.

Method

Participants

Participants were 84 regular EGM gamblers (males=61, females=23), defined as individuals who play EGMs at least once every two weeks. Participants were recruited from an undergraduate student population from the University of Sydney. The participants were recruited via an online system and received course credit for

their participation. Of the sample, 72.6% were male and the mean age was 19.5 years (range = 17 to 29, SD=2.1). One quarter (n=21) of the participants were identified by the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001) as being possible problem gamblers.

Procedure

Participants came to an experimental session held at the University of Sydney Gambling Research Unit where a lab was set up housing 10 computers that contained a program allowing simulated EGM play. Upon arriving at the experimental session participants completed a pre-test questionnaire designed to elicit their EGM play over the past two weeks. Their gambling-related thoughts and knowledge was assessed by asking them to indicate the chances of winning, losing and winning the maximum prize on an EGM, what strategies they used to win, and to complete the Gambling Related Cognitions Scale (GRCS; Raylu & Oei, 2004).

Participants then played the simulated EGMs, which were set to win on a random-ratio schedule of 10%. The machine simulated a one cent EGM and participants could vary their bet size by changing the number of lines and the amount wagered per line. Machines were preloaded with \$10,000 worth of credit, although it was explained to participants that no money was used in the session, but they were encouraged to play as they normally would during a session and were told they could stop at any time. The computers were arranged in the lab so participants could only see the computer they were assigned to. Participants were randomly allocated to one of six different message conditions that varied by mode of presentation and message content:

Mode of presentation

- 1) Messages were presented as either a static display on the side of the screen (n=31), or
- 2) A pop-up message that appeared on the screen, causing a forced break in play for 15 seconds approximately every 3 minutes (n=39)

Message Content

- 1) The informative message (n=33) was designed to inform participants of the chance of winning the major prize or the nature of the game. Participants saw either a sign that said “Your chances of winning the maximum prize are generally no better than one in a million” or “All outcomes are randomly determined by chance”.
- 2) The self-appraisal message (n=32) was designed to encourage participants to reflect on their current within session behaviour, and consider if they needed to take a break. Participants saw either a sign that said “Do you know how long you have been playing? Do you need to think about a break?” or “Have you spent more than you intended? Do you need to think about a break?”.
- 3) The control message (n=15) had no content (blank) and was designed to act as a control to see whether merely exposing participants to a sign would modify gambling-related thoughts or behaviour.

Participants were instructed to play as they normally would and were allowed to stop at any time; otherwise they were stopped after 10 minutes of play. They then completed a post-test questionnaire. This asked them to recall the sign they had seen displayed on the machine freely, then following cues. They were asked if the sign had influenced their thoughts or behaviour during the session and whether they thought if they saw the sign on a real EGM whether it would influence them in any way. The participant’s estimations of the chances of winning and gambling-related irrational

beliefs were measured again to determine if any change had occurred. Two weeks after their session, participants were sent a follow-up questionnaire to be completed and returned. This measured participants EGM play over the past 2 weeks, asked participants to recall the sign they had seen during their session, whether this sign had influenced their gambling-related thoughts or behaviour during subsequent sessions of EGM play and measured accuracy of estimations of winning and irrational beliefs. Participants were also asked to complete the CPGI (Ferris & Wynne, 2001) to determine if any participants had potential gambling problems. If participants received scores higher than eight they were given information about problem gambling and referred to the University of Sydney Gambling Treatment Clinic.

Results

These are preliminary results as this study is part of a larger project that will involve the recruitment of further subjects and greater data analysis. However, the preliminary results, while not including all possible analyses, provide a good indication of the final results and provide support for our hypotheses.

Mode of Presentation

Pop-up messages were freely recalled by significantly more participants (71.7%, $n=33$) than static messages (recalled by 39.5%, $n=15$), $\chi^2 = 9.984$, $df = 2$, $p < 0.01$.

These messages were coded by the principal investigator as: “Not accurate,” “Somewhat accurate,” or “Very accurate” and participants were significantly more accurate in their recall of message content for pop-ups than static messages, $\chi^2 = 8.221$, $df = 2$, $p < 0.02$. When asked yes/no whether they recalled seeing a sign on the machine and what it said participants stated they recalled seeing the sign; $\chi^2 = 4.410$,

$df=1, p<0.04$, and recalled what the sign said $\chi^2 = 7.074, df=2, p<0.03$, significantly more often for pop-up than static messages. Furthermore, at the two-week follow-up significantly more participants reported they recalled seeing the pop-up sign than the static sign, $\chi^2 = 10.85, df=1, p<0.01$, however there was no significant difference in the free recall or accuracy of free recall between conditions.

Participants in the pop-up condition reported that the message affected their thoughts during play (54.3% $n=25$) significantly more than participants in the static condition (26.3%, $n=10$), $\chi^2 = 6.728, df = 1, p<0.01$. Qualitative responses indicated that the pop-up messages made participants reflect on the amount of money or credits they had spent, consider whether they need to take a break, that the message broke their focus on play and they felt frustrated or annoyed. The pop-up messages also had a greater reported effect on within-session behaviour (45.7% $n=21$) than static messages (18.4%, $n=7$), $\chi^2=7.763, df = 2, p<0.03$. Quantitatively, pop-up messages made more participants finish their session earlier, slow their placement of bets, and place smaller bets.

Participants indicated that if real EGMs had pop-up messages it would affect their play significantly more (67.4% $n=31$) than static signs (40.5% $n=15$), $\chi^2 = 5.984, df = 1, p<0.02$. Specifically, participants who saw the pop-up message reported that if real EGMs had the pop-up messages it would influence their awareness of time spent playing EGMs, $\chi^2 = 6.363, df=1, p<0.02$, and length of session of play, $\chi^2 = 4.825, df = 1, p=0.03$ as compared to static messages. Participant's qualitative responses indicated that if the pop-up messages were on real EGMs it would influence them to have shorter sessions or take more breaks during play and have fewer sessions overall.

Some participants also indicated that they would change machines, which is consistent with the perception that pop-up messages were more disruptive than static messages.

Message Content

There was no significant difference in message recall between informative or self-appraisal messages but, participants stated that they recalled seeing the informative and self-appraisal messages more than the control message when asked if they recall seeing a sign during play, $\chi^2 = 15.621$, $df = 4$, $p < 0.01$, and they were significantly more accurate in their recollection of the message, $\chi^2 = 28.304$, $df = 4$, $p < 0.01$. These significant differences were maintained at the two-week follow-up as participants freely recalled the informative and self-appraisal signs significantly more than the control message, $\chi^2 = 11.088$, $df = 4$, $p < 0.03$.

The only significant different effect found immediately after the experimental session due to message content was that participants reported that if real EGMs had self-appraisal messages this would influence the length of their sessions, $\chi^2 = 8.467$, $df = 2$, $p < 0.02$, and the likelihood of taking a break, $\chi^2 = 8.524$, $df = 2$, $p < 0.02$, significantly more than both informative and control messages. Qualitative answers confirmed that the self-appraisal sign affected participants' within session thoughts by encouraging them to consider whether they needed to take a break and to reflect on the money they had spent. This finding was maintained at the two-week follow-up as participants reported the self-appraisal messages had influenced their likelihood of taking a break during subsequent EGM play significantly more than control or informative messages, $\chi^2 = 6.940$, $df = 2$, $p < 0.04$. At the two-week follow-up participant's exposed

to self-appraisal messages were significantly more accurate in their estimations of the chances of losing during EGM play compared to the informative and control message condition, $\chi^2 = 8.577$, $df = 2$, $p < 0.02$. However, preliminary data did not indicate any behavioural change between participants.

Discussion

Consistent with our hypothesis, pop-up messages were recalled significantly more than static messages. This was true for free recall of messages, cued recall, and accuracy of recall suggesting that pop-up messages captured attention more effectively, possibly by reducing competing stimuli with a forced break in play. Pop-up messages were also located in a more central location than static messages and were animated, increasing their ability to draw attention. Furthermore, pop-up messages facilitated message comprehension demonstrated by increased accuracy of message recall in this condition. This comprehension was also translated into longer-term recall as participants freely recalled pop-up messages two-weeks after being seen more often than static messages further demonstrating the success of pop-up messages in effectively communicating information and facilitating message comprehension.

Also in accordance with our hypothesis, pop-up messages had a significantly greater impact on gambling-related thoughts and behaviour and reported impact on real EGM play than static signs placed on the side of the screen. This confirms that pop-up messages were attended to and that the messages were read and comprehended in the context of gambling. This is highly significant as participants were in a laboratory-based setting and not playing with real money indicating that if messages had a

significant impact in this setting, they may have even greater implications if implemented in venues on real machines.

Self-appraisal and informative messages were recalled significantly more than control messages, although there was no significant difference in recall between informative and self-appraisal messages. This indicates that the messages were comprehended to a comparable extent so any differences between the messages should be due to content rather than recall.

Consistent with our hypothesis, self-appraisal messages had a greater reported effect on real EGM play than informative and control messages. Participants indicated that if these messages were on real EGMs it would influence their session length and likelihood of taking a break, supporting the suggestion that these messages increase player self-monitoring and results in greater behavioural change. These significant findings appear to have influenced behavioural change as participants reported that self-appraisal messages influenced the likelihood to which they took a break during subsequent EGM play. This provides valuable insight into the effectiveness of self-appraisal messages as a responsible gambling strategy as they had a greater impact on gambling thoughts and behaviour than informative or control messages.

Furthermore, self-appraisal messages resulted in increased accuracy of estimations of the chances of losing two weeks after conclusion of their experimental session. This is an interesting finding as the message did not specifically inform participants of the odds of winning or losing so this result was not due to increased knowledge through exposure to accurate statistical information. Rather, it may indicate that when

participants reflected on the time and money spent gambling they also reflected on the likelihood of losing. This is consistent with the players reported thoughts and behaviour. Based on the cognitive model of gambling, which holds that problem gambling behaviour is initiated and maintained by irrational cognitions that lead individuals to believe they have a greater chance of winning than is accurate, this suggests the message may have reduced irrational beliefs as players were more realistic about the likelihood of winning. These findings support the role of the self-appraisal messages as facilitating informed choice as the messages enhanced participant's ability to make a rational decision about their gambling behaviour based on accurate knowledge.

Pop-up messages were described by participants as being more disruptive to play and caused players to feel frustrated and annoyed compared to the static message. Harm-minimisation strategies aim to reduce harm caused by gambling, without overtly interfering with recreational gamblers. The frequency of the pop-up messages in this experiment (every 3 minutes) was greater than would be used if implemented in venues, and further research is needed to identify the optimal frequency for pop-up messages as an appropriate harm-minimisation intervention to effectively communicate information without causing excessive frustration.

This study has several methodological limitations that constrain the conclusions that can be drawn. A laboratory-based setting was used with simulated machines meaning that participants did not play with real money. Although participants were instructed to play as though it was a real machine, this may have resulted in participants not playing in a realistic way or paying attention to signs as they would in a real setting.

However, as a significant proportion of participants still reported that the signs affected their thoughts and behaviour within session it suggests some success of the simulation. Self-report data was used to measure gambling behaviour, which is not entirely reliable as participants may generalise their behaviour reducing the ability to detect small changes in behaviour. This study utilised an undergraduate university population of regular gamblers, which limits the extent to which findings can be generalised to other gamblers.

Conclusions

The results of this study indicate that pop-up messages are an appropriate mode of presentation for harm-minimisation signs on EGMs. They effectively capture attention, facilitate message comprehension and allow the message to be understood in the context of gambling with an immediate effect and longer-term effect on gambling-related thoughts and behaviours. Based on these results self-appraisal messages had the greatest reported impact on player's thoughts and behaviour. These messages were more effective than informative or control messages in modifying player's thoughts and behaviour in accordance with the aim of responsible gambling strategies. The preliminary results of this study indicate that the implementation of pop-up messages encouraging self-appraisal would be an effective harm-minimisation to influence thoughts and behaviour to reduce the risk of gambling-related harm.

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