

Does Pop-up Message Content Matter?

An Examination of the Effectiveness of Informing Gamblers about their Monetary Losses
on Player Limit Adherence

by

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Abstract

The current research tested whether monetary limit adherence is upregulated by informing gamblers who reach their limit how much money and credits they have lost gambling. In Study 1, players ($n = 124$) were given a monetary limit and gambled on an Electronic Gaming Machine. Some players were informed (via pop-up message) when their limit had been reached, while other players were also informed about credits and money lost. Limit adherence did not vary by condition. Informatively, half of the participants could not recall the content of the message. Study 2 ($n = 109$) replicated these findings. Not only did half of the players fail to recall the content of the limit reminder message, recall was not improved by including a delay that did not permit the player to immediately discard the message. The results suggest pop-up messages may not be an effective tool for conveying nuanced information to players.

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Table of Contents

| | |
|---|-----|
| List of Tables | vi |
| List of Appendices | vii |
| Introduction..... | 1 |
| The Risks Associated with EGM play..... | 3 |
| The Responsible Gambling Utility of Pop-Up Messaging: A Tool to Advance Informed Decision Making..... | 5 |
| Are Limit Reminders Enough? The Potential Benefits of Informing Players about their Monetary Loss..... | 7 |
| Present Research | 9 |
| Study 1 | 10 |
| Methods..... | 11 |
| Participants | 11 |
| Procedure | 11 |
| Measures | 13 |
| Results..... | 14 |
| Preliminary Analyses..... | 14 |
| Main Analyses | 15 |
| Discussion..... | 16 |
| Study 2 | 18 |
| Methods..... | 20 |
| Participants | 20 |
| Procedure | 20 |
| Measures | 22 |
| Results..... | 23 |
| Preliminary Analyses..... | 23 |
| Main Analyses | 25 |
| Discussion..... | 26 |
| General Discussion | 28 |
| Implications | 32 |
| Limitations..... | 35 |
| Conclusion | 36 |
| References..... | 38 |
| List of Tables | 47 |
| Appendix A: Recruitment Script | 49 |
| Appendix B: Explanation of Study 1 | 50 |
| Appendix C: Informed Consent for Study 1 | 51 |
| Appendix D: Demographics | 53 |
| Appendix E: Limit Adherence Measure for Study 1 | 54 |
| Appendix F: Manipulation Check..... | 55 |

| | |
|---|----|
| Appendix G: Problem Gambling Severity Index..... | 56 |
| Appendix H: Debriefing for Study 1 | 58 |
| Appendix I: Informed Consent to the use of Data for Study 1 | 61 |
| Appendix J: Informed Consent for Study 2 | 62 |
| Appendix K: Explanation of Study 2..... | 65 |
| Appendix L: Limit Adherence Measure for Study 2 | 66 |
| Appendix M: Craving Measures for Study 2..... | 67 |
| Appendix N: Debriefing for Study 2 | 68 |
| Appendix O: Informed Consent to the use of Data for Study 2..... | 71 |

List of Tables

| | |
|---|----|
| Table 1. <i>Frequency of responses to the manipulation check by condition for Studies 1 and 2</i> | 47 |
| Table 2. <i>Demographics, gambling characteristics and limit adherence by condition for Study 2</i> | 48 |

List of Appendices

| | |
|---|----|
| Appendix A: Recruitment Script | 49 |
| Appendix B: Explanation of Study 1 | 50 |
| Appendix C: Informed Consent for Study 1 | 51 |
| Appendix D: Demographics | 53 |
| Appendix E: Limit Adherence Measure for Study 1 | 54 |
| Appendix F: Manipulation Check..... | 55 |
| Appendix G: Problem Gambling Severity Index..... | 56 |
| Appendix H: Debriefing for Study 1 | 58 |
| Appendix I: Informed Consent to the use of Data for Study 1 | 61 |
| Appendix J: Informed Consent for Study 2 | 62 |
| Appendix K: Explanation of Study 2..... | 65 |
| Appendix L: Limit Adherence Measure for Study 2 | 66 |
| Appendix M: Craving Measures for Study 2..... | 67 |
| Appendix N: Debriefing for Study 2 | 68 |
| Appendix O: Informed Consent to the use of Data for Study 2..... | 71 |

Does Pop-up Message Content Matter?

An Examination of the Effectiveness of Informing Gamblers about their Monetary Losses on Player Limit Adherence

Gambling is an activity in which a person wagers money or objects of monetary value on an event with an outcome that is largely determined by chance with the primary objective being to win more money or objects of value than were initially wagered. Unfortunately, some people gamble excessively, which can lead to an array of financial, legal, and social/vocational difficulties (Hodgins, Stea, & Grant, 2011; Petry & Armentano, 1999). Those who play electronic gaming machines (EGMs; e.g., slot machines) are at an especially high risk for developing gambling problems. This is because the structural characteristics of EGMs make them highly addictive. In particular, EGMs are quick to play and the outcomes of the spins are based on highly addictive reward ratios (Dixon, Harrigan, Sandhu, Collins, & Fugelsang, 2010; Harrigan, Dixon, MacLaren, Collins, & Fugelsang, 2011). Additionally, EGMs are constructed to have appealing sounds, animations and lights that enthrall the player (Finlay, Marmurek, Kanetkar, & Londerville, 2005; Fisher & Griffiths, 1995). These structural characteristics not only draw players to EGMs, but also lead them to gamble excessively (i.e., play with more money or time than they can afford to spend; Griffiths, 1993). Unfortunately, excessive gambling is associated with emotional and physical distress (Lesieur & Custer, 1984; Petry, 2005; Suurvali, Hodgins, Tonneatto, & Cunningham, 2008).

To minimize the harm associated with EGM play, responsible gambling tools have been developed that use messages to help inform and educate players about the

potential risks associated with play. Indeed, some gambling operators have sought to educate the gambler and facilitate responsible play via pop-up messages – a graphical display area containing messages that is usually a small window that suddenly appears or “pops up” in the foreground of an EGM. For example, the player might receive a message that the odds of winning are low (Monaghan & Blaszczynski, 2007, 2010). Other messages are designed to help the player limit the amount of time and/or money they spend gambling. For instance, the player might be invited (via pop-up message) to set a monetary (Auer & Griffiths, 2013; Wohl, Gainsbury, Stewart, & Sztainert, 2013; Stewart & Wohl, 2013) or time limit (Kim, Wohl, Stewart, Sztainert, & Gainsbury, 2014) on their play. The pop-up message may also be used to remind the player when that limit is reached (see Auer & Griffiths, 2013; Kim et al., 2014; Wohl et al., 2013). Such messaging has been shown to help players set a limit on the amount of time or money they spend gambling and, importantly, adhere to that limit (Wohl et al., 2013; Kim et al., 2014, Stewart & Wohl, 2013).

Typically, gambling operators provide players with a limit reminder message that notifies them that their monetary limit has been reached (e.g., Ontario Lottery and Gaming) or that their time limit has been reached (e.g., Manitoba Liquor and Lotteries), but the message provided does not indicate how much money or time has been spent gambling (i.e., players are *only* informed that their limit has been reached). Responsible gambling research conducted in the laboratory typically informs players that their credit limit has been reached, but the money equivalent of those credits is not provided to players (see Stewart & Wohl, 2013; Wohl et al., 2013). To my knowledge, no gambling operator informs the player about the amount of credits *and* money they have lost once

their limit has been reached and no research has assessed the responsible gambling utility of providing such information.

It is important to test the efficacy of providing players with clear information about gambling expenditures (i.e., how much money has been spent) because players' ability to accurately recall their gambling expenditures is remarkably poor (Auer & Griffiths, in press; Wohl, Davis, & Hollingshead, 2017), which may be a contributing factor for players failing to adhere to a pre-set limit on play. One reason for players' poor recall of their gambling-related expenditures may be the tokenization of money (i.e., "coin in" is displayed in terms of credits and not dollars) that is common to EGMs. Most people find it difficult to mentally convert tokens in their possession into their monetary value, which undermines gamblers ability to keep track of their gambling-related expenditures (White, Mun, Kauffman, Whelan, Regan, & Kelly, 2006). The current research assessed whether providing players with specific personalized information via pop-up message about how many credits *as well as* how much money they had lost when their limit had been reached would increase monetary limit adherence.

The Risks Associated with EGM Play

EGMs are a highly popular form of gambling. Indeed, most gambling revenue (i.e., approximately 60%) comes from EGM players (Williams & Wood, 2005). Unfortunately, although these games are popular, they tend to be associated with increased risk for the development of problem gambling. For instance, in Canada, provinces with a higher number of EGMs are also more likely to have higher prevalence rates of problem gambling (Cox, Yu, Afifi, & Ladouceur, 2005). Moreover, players who

play EGMs are also more likely to develop pathological levels of gambling at a faster rate compared to those who play other forms of gambling (Breen & Zimmerman, 2002).

The addictive quality of EGMs can be explained, in part, by the games' structural characteristics (for a review see Parke & Griffiths, 2006). Specifically, EGMs typically reward players on a highly addictive variable-ratio reinforcement schedule and entice gamblers with their rapid speed of play, exciting noises and visual displays (see Dixon & Schreiber, 2004; Griffiths, 1991; 1993; Kassinove & Schare, 2001), which all contribute to the development of problem gambling (Dixon et al., 2010; Griffiths, 1999; Harrigan et al., 2011; Parke & Griffiths, 2006). This is because the structural characteristics of EGMs help the player to enter a trance like state (i.e., they dissociate), resulting in the player losing track of time, space, and the amount of money spent gambling (Diskin & Hodgins, 1999, 2001; Jacobs, 1988). Unfortunately, entering into a dissociative state when gambling can lead to excessive play (Grant & Kim, 2003; Kofoed, Morgan, Buchkowski, & Carr, 1997; Stewart & Wohl, 2013; Wynne, 1994).

In addition to the excessive play associated with the structural characteristics of EGMs, many players hold irrational beliefs about how slot machines function. That is, players tend to have an incorrect perception of their chances of winning (Sharpe & TARRIER, 1993). For example, although the outcome of each play on an EGM is randomly determined and the outcome of each spin is independent from the previous spin, players often hold irrational beliefs about their ability to exert influence over the objectively uncontrollable outcomes in games of chance (Turner & Horbay, 2004; Wohl, Santesso, & Harrigan, 2013). For example, some players believe they possess personal luck that can be used to maximize positive outcomes (Wohl & Enzle, 2003; Wohl, Young, & Hart,

2007) or that the odds of winning increase after a string of losses (Goodie, 2015; Goodie & Fortune, 2013; Hahmann, 2016; Langer, 1975; Rockloff & Hing, 2013). Consequently, it is important for there to be responsible gambling tools that educate the player about their odds of success and correct any irrational beliefs they might have about how EGMs work (Wohl, Christie, Matheson, & Anisman, 2010).

The Responsible Gambling Utility of Pop-Up Messaging: A Tool to Advance Informed Decision Making

Pop-up messages are quick displays of text that suddenly appear on digital screens. Gambling operators tend to use pop-up messages to convey responsible gambling information to players by having them appear on the foreground of EGMs during play. These messages are designed to help players make informed decisions about their gambling (e.g., stop or continue playing), while being minimally invasive for game play. Responsible gambling oriented pop-up messages help teach players, among other things, about how slot machines work as well as their odds of success (Ladouceur & Sevigny, 2003; Gallagher, Nicki, Otteson, & Elliott, 2011), which helps to correct the irrational cognitions that are commonly endorsed by EGM players. Floyd, Whelan and Meyers (2006) found that when players were educated about common irrational gambling beliefs and then presented with a pop-up message during play that reminded them they were playing a purely chance-based game, the players were less likely (compared to players in a control condition) to endorse irrational gambling beliefs after playing (e.g., illusions of control, predictive ability of outcomes, interdependence of spins). Moreover, they were more likely to make better gambling decisions (e.g., played fewer spins, made more conservative bets). In a similar vein, Benhsain, Taillefer, and Ladouceur (2003)

found that when recreational gamblers were reminded during a game of electronic roulette that each spin outcome is independent and does not influence the next spin, players were less likely to voice irrational predictive control cognitions aloud and were less motivated to continue gameplay. Similarly, Dixon (2000) found that when roulette players were informed that selecting a specific number to place their bet on (e.g., choosing a favourite number) does not influence the outcome of the spin, they had more realistic predictions of their wins.

Unfortunately, although there is some research to suggest responsible gambling-oriented messaging can help improve irrational cognitions, there is also evidence to the contrary. For example, Monaghan, Blaszczynski and Nower (2009) exposed undergraduate student gamblers to standard responsible gambling messages taped to the corner of an EGM that either stated the odds of winning or was an informative message that explained the lack of control the player has on the outcome. Interestingly, players could not recall the content of the message in either condition. Not surprisingly then, condition did not modify gambling-related irrational cognitions. The fact that the type of information presented during game play did not have an effect on cognitions about gambling may be due to the ‘double switching’ phenomenon – the tendency for EGM players to have high levels of rational cognitions about gambling before playing on the machine, but not during play (Sevigny & Ladouceur, 2003). Put another way, EGM players tend to ‘switch off’ their rational thinking whilst gambling, resulting in the endorsement of irrational beliefs. In this light, it could be that viewing an informative pop-up message had no effect on participants because their rational patterns of thought were ‘switched off’.

I argue that one way to combat the double switch phenomenon is to provide players with pop-up messages that are personally tailored to their gambling session. That is, instead of merely providing players with information about the odds of winning (which they may ignore or fail to believe in the midst of play), players may benefit from targeted information about how much money they have lost in a given gambling session. My argument rests on the utility of pop-up messages to provide self-relevant information to players, which benefits informed decision making (Blaszczynski, Ladouceur, & Shaffer, 2004; Responsible Gambling Council, 2010). Providing supporting evidence for my argument, Monaghan and Blaszczynski (2010) found that messages that encouraged self-appraisal (i.e., reflecting on one's game play) had more influence on gambling thoughts and behaviours both during and post-gambling compared to informative (i.e., explaining the odds) or control messages that were not relevant to the player's own gambling. With that said, gamblers tend to be poor at recalling how much time and money they have spent playing (Wohl et al., 2017). Therefore, when asked to think about whether they have been gambling too long, players may not realize or acknowledge this, as such, they may continue gambling. It may be that providing players with specific self-relevant information, such as money lost during a given gambling session would be better for reducing excessive gambling.

Are Limit Reminders Enough? The Potential Benefits of Informing Players about their Monetary Loss

To help facilitate informed decision-making, some Canadian casino operators allow their players to access personal information through their player account about how much money they have won or lost over a specified period of time. However, this

information tends to be inconvenient to access. For instance, with PlayOLG, the Ontario online casino, registered players have to click through multiple pages to see their recorded losses. As another example, in Manitoba, people are told how much money they currently have deposited into the machine, but it does not keep track of any money that was previously deposited in the current gambling session. As such, a player who loads money into the machine after losing their initial investment will not be provided information about total money lost (only the amount of money lost since the last time they deposited money). Even when information about gambling expenditure is easy to access, players may still not take the necessary steps to view this information. Wohl, Parush, Kim, and Warren (2014), for example, found that although EGM players were told that they could view how much money they had lost at any time during a gambling session by pressing a single button on the keyboard, not a single participant chose to view this information. Players may be keen to know how much money they have spent gambling (see Wohl et al., 2017), but are relatively reluctant to access this information during a gambling session.

One possible explanation for why players fail to access information about their spending during play is that people may believe they can accurately account for their gambling expenditures (see Wohl & Davis, 2017). However, as previously noted, Wohl and colleagues (2017) found that people were highly inaccurate at recalling how much money they had won or lost gambling. The tokenization of EGMs may be one culprit for players' inaccurate accounting of their gambling expenditures. Information on EGMs is commonly presented to players in terms of credits (e.g., a player loads \$20 into the machine which is then converted into credits). Research has demonstrated that

tokenization makes it hard for players to keep track of their spending because it is difficult for them to do mathematical conversions of that type quickly (White et al, 2006). This tokenization of monies lost may cause a problem for responsible gambling strategies. Specifically, the player may be more likely to exceed their limit because monies lost is not properly considered – they are not provided with the necessary information to make a proper informed choice.

In this light, to help players make informed decisions (i.e., whether to keep playing) it may be necessary to present information about a player's expenditures without asking the player to access this information him or herself. One way to do this is via a pop-up message, particularly when the player has reached his or her limit. Moreover, the limit reminder message will likely have the greatest responsible gambling utility (i.e., it encourages limit adherence) if it conveys to the player the amount of credits *and* money lost (compared to a reminder that only tells the player that their limit has been reached).

Present Research

To assess whether pop-up limit reminder messages containing information about the amount of credits *and* money lost would be effective at helping players adhere to their monetary limit, two studies were conducted that used a sample of community gamblers. In Study 1, I hypothesized that players who viewed a pop-up limit reminder message that included information about credits and money lost would be more likely to adhere to their limit compared to those who received a limit reminder message simply telling them that their limit had been reached. In Study 2, I further investigated this issue by testing the interaction effects between message content (i.e., information about monetary loss) and an inability to immediately discard the pop-up message. Specifically, I hypothesized that

players who received a pop-up message informing them that they had reached their limit in terms of credits and money lost and were also unable to discard the message for ten seconds would be more likely to adhere to their limit compared to players who could discard the message immediately.

Post-hoc power analyses conducted for both Study 1 and Study 2 indicated a sample size of 2000 participants (1000 per cell) was needed for Study 1 and 460 participants (115 per cell) was needed for Study 2 to achieve 80% power. The required sample sizes were not feasible due to the extensive resources (e.g., money, time, permission to use casino venue space) that would be required. However, the sample sizes for both Studies 1 and 2 were determined by examining the typical sample sizes used in other gambling research that has tested the utility of pop-up responsible gambling messages (approximately 30 per cell).

Study 1

The purpose of Study 1 was to test the efficacy of an enhanced limit reminder pop-up message that included detailed information about the exact amount of money and credits players had lost during play. To this end, a community sample of gamblers were told they had \$10 to gamble with on a virtual EGM on a laptop – this acted as their monetary limit. Previous research using this virtual EGM has demonstrated that its visuals and sound effects mimic those of a real slot machine and its play elicits similar behaviour and cognitions among gamblers (Kim et al., 2014; Stewart & Wohl, 2013; Wohl et al., 2014). Players were also told they would receive an additional \$10 as compensation for participating. Participants were randomly assigned to either receive a simple limit reminder pop-up message informing them that their limit had been reached

or a detailed limit reminder pop-up message with added information about the exact amount of money and credits lost whilst playing. After viewing the pop-up message, players were asked whether they would like to use any of their participation money to continue playing. It was predicted that players who viewed the more detailed pop-up message would be more likely to decline additional play and adhere to their monetary limit.

Methods

Participants

Participants ($n = 131$) were a community based sample of gamblers recruited from one slots and racetrack venue in Ontario ($n = 66$; 31 males) and one casino in Manitoba ($n = 65$; 31 males). Participation was limited to those individuals who were over the age of 18 and had not now nor ever sought treatment for their gambling behaviour.

Additionally, participants needed to be at the venue to play slots and had to indicate that they had not previously gambled on the day of the study. They ranged in age from 18 to 86 years ($M = 56.94$, $SD = 16.47$). Participants were compensated with a \$20.00 Tim Horton's gift card for participating in the study which took an average 30 minutes to complete.

Procedure

Upon entering the slots venue, patrons were approached and asked if they would be interested in participating in psychological research on gambling (see Appendix A for recruitment script). Eligible participants were then directed to the location of the experiment. Before beginning the study, it was explained to the participants how the study would proceed (Appendix B). After granting consent (Appendix C), participants

completed a filler battery of questionnaires and were asked about their demographics (Appendix D). After completing the questionnaires, participants were directed to a computer on which a virtual reality casino was loaded (see Young, Wohl, Matheson, Bauman, & Anisman, 2008 for a detailed description). Moreover, a single-line, slot machine styled EGM was displayed. Participants were told that \$20 or 80 credits had been pre-loaded into the game. Of this \$20, \$10 (the equivalent of 40 credits on the EGM) was compensation for their participation which they would receive in the form of a Tim Horton's gift card and the other \$10 (the equivalent of 40 credits on the EGM) was for them to gamble with on the machine. They were told that they could gamble as much or as little of the \$10 meant for gambling as they pleased and that any money they won would be cashed out and placed onto an additional Tim Horton's gift card. The \$10 allocated to gambling acted as the monetary limit for all participants.

Upon losing the \$10, participants received one of two pop-up messages. In the simple limit reminder condition ($n = 63$), participants received a message that only informed them their limit was reached ("You have reached the maximum budget you set for yourself today"). In the detailed limit reminder condition ($n = 68$)¹, participants received a message that informed them that their limit was reached as well as how much money and credits they had lost ("You have reached the maximum budget you set for yourself today (\$10 = 40 credits).") Thereafter, all participants were given the opportunity to continue playing using their (\$10) compensation funds, which were already loaded into

¹ The imbalance between conditions was due to five participants withdrawing after granting consent.

the EGM. Their decision to adhere to the pre-set limit (or not) was recorded and served as the central dependent measure (Appendix E).

Immediately after making the decision to adhere to the \$10 pre-set limit (or not), participants were asked to complete a close-ended, multiple choice item that asked them to report the content of the pop-up message they received (see Appendix F). This item served as a check on the manipulation. Lastly, participants were asked to complete the Problem Gambling Severity index (see Appendix G; PGSI; Ferris & Wynne, 2001). They were then fully debriefed (see Appendix H), asked to complete an informed consent to the use of their data (see Appendix I), and compensated for their time (all participants received a \$20 gift card to Tim Horton's).

Measures

Manipulation Check. The manipulation check item tested participants on their recollection of the pop-up message. This item was: "What message did you receive when you reached your limit?" The response options were "*I was NOT reminded when my limit was reached*", "*I was told I reached my limit INCLUDING number of credits played AND how much money I played*", and "*I was ONLY told I reached my limit.*"

Limit Adherence. To assess limit adherence, participants were asked "Now that you have spent your \$10 worth of credits, would you like to use any of your participation money that remains in the machine to keep playing?" Response options included "Yes" or "No".

Problem Gambling Symptomology. Problem gambling symptomology was assessed using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The PGSI contains nine items that assess disordered gambling behaviour (e.g., "Have you

needed to gamble with larger amounts of money to get the same feeling of excitement?") and consequences of disordered gambling (e.g., "Have you felt guilty about the way you gamble or what happens when you gamble?"). The items were measured on a scale anchored at 0 (*never*) and 3 (*almost always*). Participants' scores were summed to obtain a total score (ranging from 0 to 27), which was used to classify participants into one of four categories. A gambler with a score of 0 was categorized as a non-problem gambler, 1-2 as a low-risk gambler, 3-7 as a moderate-risk gambler, and 8 or more as a disordered gambler ($\alpha = .96$).

Results

Preliminary Analyses. Five participants did not answer the manipulation check and were removed from all subsequent analyses. Additionally, two participants were removed from analyses because they ended their gambling session early and were not presented with a pop-up message. As a result, the final sample size consisted of 124 (64 = Ontario, 30 males; 60 = Manitoba, 28 males) gamblers (59 = simple limit reminder condition, 65 = detailed limit reminder condition). These participants ranged in age from 18 to 86 ($M = 57.45$, $SD = 15.87$). Of these participants, two reported gambling more than once a day (1.6%), 31 (25.2%) reported gambling more than once a week, 50 (40.7%) reported gambling more than once a month, 16 (13%) reported gambling more than once every three months, and 24 (19.5%) reported gambling less than once every three months. Moreover, years spent gambling ranged from less than a year to 71 years ($M = 15.21$, $SD = 12.13$).

There were no statistically significant differences between condition on either age, $t(114) = -1.10$, $p = .64$ or sex, $\chi^2(1) = .26$, $p = .61$, as such, analyses were collapsed

across these variables. Additionally, there were no significant differences between conditions on problem gambling severity, $t(113) = -.75, p = .41$. Therefore, I also collapsed across this variable for all subsequent analyses. Informatively, however, participants had an average score of 3.29 ($SD = 4.46$) on the PGSI (Ferris & Wynne, 2001), suggesting that (on average) participants were moderate to problem gamblers.

I also examined whether there was a main effect of recruitment location as well as whether there were any interactions between recruitment location and condition on any of the measured variables of interest. There were no statistically significant differences between recruitment location on the participant's success on the manipulation check, $\chi^2(1) = 2.65, p = .10$, or their level of gambling pathology, $t(113) = .78, p = .43$. As well, there were no interaction effects between recruitment location and condition on correctly answering the manipulation check, Wald's $\chi^2(3) = 2.85, p = .09, B = 1.26, SE = .74, OR = 3.52, 95\% CI = [.82, 15.16]$ or level of gambling pathology, $F(3, 111) = 2.02, p = .11$.

There was a significant main effect of location on participant's limit adherence, $\chi^2(1) = 5.51, p = .02$. Players were more apt to adhere to their limit in Winnipeg (57/60, 95%) compared to Ottawa (52/64, 81.3%). However, there was no interaction effects between recruitment location and condition on limit adherence, Wald's $\chi^2(3) = .08, p = .78, B = -.40, SE = 1.41, OR = .67, 95\% CI = [.04, 10.66]$. That said, due to the main effect of location, I controlled for location of recruitment in all subsequent analyses.²

Main Analyses. Informatively, roughly half of the participants (49.2%) failed the attention check item. A binary logistic regression was conducted with failing the

² Although location was controlled for in all main analyses, the results do not change when location is not included in the model.

manipulation check as the dependent variable and condition (coded as 0 = simple limit reminder message, 1 = detailed limit reminder message) as the predictor. This was done to assess whether there were differences between conditions. Results demonstrated that condition did not significantly predict failing the manipulation check, Wald's $\chi^2(2) = 3.22, p = .07, B = .66, SE = .37, OR = 1.94, 95\% CI = [.94, 4.00]$ (simple: $n = 24/59$ or 40.7%, detailed: $n = 37/65$ or 56.9%, see Table 1 for a breakdown of response option counts by condition). The high rate of failure to the manipulation check suggests the manipulation failed, thus, results should be interpreted with caution. As the main analyses, a binary logistic regression was conducted with limit adherence as the dependent variable and condition (coded as 0 = simple limit reminder, 1 = detailed limit reminder) as the predictor. Results indicated that condition did not significantly predict limit adherence, Wald's $\chi^2(2) = .37, p = .55, B = .35, SE = .57, OR = 1.41, 95\% CI = [.46, 4.35]$ (simple: $n = 53/59$; detailed: $n = 56/65$).

Discussion

Typically, the only information that players are told when they reach their monetary limit is that their limit has been reached. In order to facilitate informed decision making, thereby (ideally) increasing limit adherence, I put forth the proposition that limit adherence would be upregulated if players were reminded about how many credits they lost and their monetary value in addition to the fact that their pre-set limit had been reached. To test this idea, a community sample of gamblers gambled on a virtual reality EGM until they reached their \$10 limit. They then either received a detailed limit reminder message that included the amount of money and credits lost or they received a message that simply told them their limit had been reached.

Contrary to my hypothesis, manipulating message content to increase the amount of information provided to players about their gambling did not influence limit adherence. Specifically, participants who received a reminder message that included detailed information about the amount of money and credits lost did not differ in the extent to which they adhered to their monetary limit compared to those who were simply told that their limit had been reached. A cursory examination of the results from Study 1 might lead to the conclusion that responsible gambling is not upregulated by informing a player about the amount of money they have lost in a particular session. An alternative interpretation of the results, however, comes into focus when taking responses to the manipulation check item into consideration. Half of the sample failed the manipulation check – they were not able to accurately recall the content of the message. This large proportion of failure suggests that participants may not be reading the message. If participants are not reading the content of the message, there is no way for the message to increase informed decision making.

A methodological aspect of Study 1 may provide a clue about whether participants were reading the message. Specifically, participants could discard the pop-up message immediately by clicking a “continue” button. If a participant did discard the message immediately, it is unlikely they read the content of the message, thus undermining any responsible gambling utility of the content. Unfortunately, the virtual reality casino does not track the amount of time the pop-up is visible. As such, we have no direct way to assess this possibility.

Another potential methodological issue in Study 1 was that participants did not set their own monetary limit, rather they were assigned a limit of \$10. Because the

participants did not set their own limit, the limit reminder could be viewed as unimportant to the player. Researchers have suggested pop-up messages are most effective when they contain self-relevant information (Monaghan & Blaszczynski, 2009), therefore, players may be more attentive to limit reminder messages if they set their limit for themselves. In this light, players determine what they are personally comfortable spending and therefore, may be more invested and will care more when they are reminded that they have spent that amount.

A second study was conducted that sought to address the potential issues caused by 1) allowing players to exit the pop-up message immediately and 2) determining a monetary limit on the player's behalf.

Study 2

The purpose of Study 2 was to test the idea that attention to the content of the message may improve (operationally defined as correct recollection of the message), and thus limit adherence would be increased, if the players' ability to discard the pop-up message was delayed. This idea is based on research that points to the responsible gambling utility of temporarily restricting access to continued play. Cloutier, Ladouceur and Sevigny (2006), for example found that wagering decreased when players were forced to pause their gambling session for seven seconds. Additionally, Stewart and Wohl (2013) showed that pop-up messages that stop play reduce dissociation, which is a strong predictor of excessive gambling among EGM players (see Diskin & Hodgins, 1999, 2001). Importantly, however, Blaszczynski, Cowley, Anthony, and Hinsley (2016), argued that temporary restrictions to play should be accompanied by responsible gambling messages because restricting access to play without responsible gambling

messages can heighten craving to gamble. Thus, in Study 2, I manipulated whether participants were able to immediately close the pop-up message window. I hypothesized that players whose ability to discard the pop-up was delayed by 10 seconds would a) be more likely to correctly recall the content of the message and thus b) be more likely to adhere to their limit (compared to those who could discard the message immediately). I also hypothesized that the inability to quickly discard the message and message content would have additive effects whereby, those who received the more informative message and were also temporarily delayed play would have the highest likelihood of limit adherence.

I also tested whether a delay in the players' ability to discard the pop-up message would influence craving to gamble. This was done for two reasons. First, I wanted to test whether the limit reminder message content would have an effect on the player's gambling behaviour outside of the experiment. All of the participants were at the gambling venue to have the experience of gambling on the betting floor, not in a virtual reality casino for a psychological study about gambling. Additionally, the EGM in the virtual reality casino was pre-programmed so that participants lost at a fast rate. For these reasons, participants may crave to continue gambling, just not on the EGM in the virtual reality casino. As such, I assessed participants overall level of craving to gamble as well as their desire to play slots on the betting floor of the gambling venue. Additionally, assessing participants' craving to gamble allowed me to test Blaszczynski and colleagues (2016) contention that temporary delays in play paired with responsible gambling messaging decrease craving to gamble. Specifically, I hypothesized that participants who could not discard the pop-up message for 10 seconds would have the

lowest levels of craving to gamble (compared to participants who could discard the message immediately). Moreover, given that Blaszczynski et al (2016) also posited that responsible gambling messaging content may undermine craving to gamble, I tested whether there was a negative relationship between the amount of responsible gambling information provided to players and level of craving. I hypothesized that craving would be lower in the detailed limit reminder condition compared to the simple limit reminder condition.

Lastly, conducting a second study allowed me to enhance the realism of the experiment. In Study 1, participants were assigned a \$10 limit. In Study 2, participants pre-set their own monetary limit. Participants were, akin to Study 1, told they would be given \$10 to play with in the virtual reality casino, however, they were also told they did not need to spend the \$10 in its entirety (i.e., they could set a limit below the \$10 provided) and that any money not played would be theirs to keep.

Methods

Participants. Community gamblers ($n = 141$; 52 male, 81 female, 8 unreported) were recruited from a single slots and racetrack venue in Ontario. Patrons of the venue were eligible to participate if they had never sought nor were currently enrolled in treatment for gambling-related problems and if they were of legal age to gamble. Additionally, participants were not eligible if they had previously gambled that day or had participated in Study 1. Participants ranged in age from 19 to 90 years ($M = 59.46$, $SD = 15.02$). As in Study 1, participants were compensated with a \$20.00 Tim Horton's gift card for participating. The study took approximately 30 minutes to complete.

Procedure

After participants were recruited (see Study 1 for recruitment methodology and Appendix A for recruitment script) and granted consent (Appendix J), a research assistant explained to the participants the process of the study (Appendix K). They were told that they could gamble with up to \$10 on a virtual EGM. Participants were then asked how much of this \$10 in gambling money they would like to spend. This value acted as the participants' limit. After setting their monetary limit, the participants completed demographics (see Appendix D) and filler questionnaires. This provided an opportunity for the experimenter to program the pop-up message in the virtual reality EGM with the participant's self-imposed limit.

Participants were then randomly assigned to one of the four conditions corresponding to the 2 (limit reminder message content manipulation: simple message vs. detailed message) x 2 (ability to discard the message manipulation: immediately vs. delayed) between-participants design. As in Study 1, I manipulated the type of information participants received when they reached their pre-set limit. The message in the simple limit reminder condition was the same as in Study 1. In the detailed limit reminder condition, the message was slightly changed for the purpose of clarity. Specifically, participants read, "You have reached the budget of [insert dollar amount] or [insert credit amount] you set for yourself today."

In order to manipulate whether participants had the ability to immediately discard the pop-up message, for half of the participants, the virtual reality casino was programmed such that the "continue" button that allowed the participant to continue the game was greyed out for a period of 10 seconds. A counter was also included so participants knew how much longer it would be before they could click the button. So

that there was no confusion, text was placed in the bottom right hand corner of the pop-up message that read “continue in ...”. In the immediate condition, no counter was present. The “continue” button could be clicked whenever the participant desired to do so.

After clicking the continue button, participants were asked whether they would like to use any of their remaining funds to continue playing – this acted as the central dependent measure of limit adherence (Appendix L). They were also asked to report the content of the message that had appeared in the pop-up. This served as the manipulation check (see Appendix F). Participants then completed a questionnaire battery that included scales that assessed their craving to gamble (Appendix M) and their gambling severity (see Appendix G). Lastly, participants were fully debriefed (Appendix N), completed an informed consent to the use of their data (Appendix O) and were compensated for their time with a \$20 gift card to Tim Horton’s.

Measures

Manipulation Check. Recall of the pop-up message was measured using the same manipulation check item used in Study 1.

Limit Adherence. Limit adherence was assessed by asking participants orally, “In this casino we have a lot of different games, such as, different slot machines, electronic poker and at the back we have blackjack and poker tables. Now that you have played your [STATE LIMIT] on the slot machine, would you like to use any of your remaining money to gamble on any of the other games?” Response options were “*Yes*” or “*No*”.

General Craving to Gamble. A single item (adapted from Young et al., 2008) was used to assess overall craving to gamble. This item was: “How would you rate your desire to gamble”. The item was anchored at 0 (*no desire to gamble*) and 100 (*an overwhelming desire to gamble*).

Desire to Continue Playing Slots. A three-item scale was constructed to assess participants’ level of craving to continue playing slots at the adjoining gambling venue. These items were: “I have a strong desire to play on a slot machine right now at the Rideau Carleton Raceway”, “I have an urge to gamble right now at the Rideau Carleton Raceway” and “At the moment, I lost my desire to gamble today at the Rideau Carleton Raceway” (reverse scored). These items were anchored at 1 (*Strongly Disagree*) and 7 (*Strongly Agree*). The reliability for the three-item experimenter designed scale was relatively low ($\alpha = .60$), as such, descriptive statistics for the scale were found by deleting 1 item at a time from the reliability analyses systematically. It was concluded that the reliability was greatly improved by excluding the reverse coded item ($r = .77$). In conclusion, a scale comprised of the first two items was used to assess current desire to play slots.³

Problem Gambling Symptomology. As in Study 1, problem gambling severity was assessed with the PGSI ($\alpha = .91$; Ferris & Wynne, 2001).

Results

Preliminary Analyses. Two participants used extreme responding and two participants ended their participation in the study early, as such, these four participants

³ Results were unchanged when the three-item scale was used as the dependent measure of desire to continue gambling.

were excluded from all analyses. An additional 28 participants were excluded for failing to answer the manipulation check. The final sample consisted of 109 gamblers (40 = male, 66 = female, 3 = unreported). Participants ranged in age from 21 to 90 ($M = 59.12$, $SD = 14.53$). One participant reported gambling more than once a day (0.9%), 24 participants reported gambling more than once a week (20.6%), 34 participants reported gambling more than once a month (32.1%), 26 participants reported gambling more than once every three months (24.5%) and lastly, 21 participants reported gambling less than once every three months (19.8%). Years having gambled ranged from 1 to 50 ($M = 14.28$, $SD = 10.07$). There were no significant differences between condition in age, years having gambled or gambling pathology. As such, these variables were collapsed across all subsequent analyses (see Table 2 for demographics by condition). There were however significant differences in the distribution of sex between conditions (see Table 2). Therefore, sex was controlled for in all main analyses.⁴

Participants set an average limit of \$8.71 ($SD = 2.23$, range from \$1.50 to \$10.00) however, modal limit set was \$10 ($n = 75/108$ or 68.8%). The average limit set did not differ by condition, $F(3, 105) = .77, p = .50$.⁵ Additionally, there was no main effect of limit reminder message content, $\beta = -.13, t(105) = -.93, p = .35$, or ability to discard the message, $\beta = .09, t(105) = -.67, p = .50$, on the monetary limit set by players. As well, there was not a significant interaction effect, $\beta = .24, t(105) = 1.45, p = .15$. See Table 2 for average limit set by condition.

⁴ Although sex was controlled for in all main analyses, the results do not change when sex is not included in the model.

⁵ The results are unchanged when the players' monetary limit is entered in as a covariate and controlled for in the model.

Main Analyses

Manipulation Check. Similar to Study 1, a large portion of the participants failed the manipulation check (40.4%). A chi-square test was conducted to examine whether there was an effect of condition on failure of the manipulation check. The results indicated there was no such effect, $\chi^2(3) = .42, p = .94$ (see Table 1 for failure of manipulation check by condition). Given the high rate of failure, results from all subsequent analyses should be interpreted with caution.

Limit Adherence. A binary logistic regression was conducted with limit adherence as the dependent variable and the limit reminder message manipulation (coded as 0 = simple message, 1 = detailed message), the ability to discard the message manipulation (coded 0 = immediately, 1 = delayed) and their interaction term as the predictor variables. The results from the omnibus test of the model were insignificant, $\chi^2(4) = 3.52, p = .47$. In more detail, the results indicated that there was not a significant main effect of the limit reminder message content, Wald's $\chi^2(4) = .20, p = .66, B = -.57, SE = 1.29, OR = .56, 95\% CI = [.04, 7.04]$, or the ability to discard the message manipulation, Wald's $\chi^2(4) = 1.15, p = .28, B = .99, SE = .93, OR = 2.70, 95\% CI = [.44, 16.61]$. Additionally, there was not a significant interaction effect, Wald's $\chi^2(4) = .40, p = .52, B = -1.11, SE = 1.75, OR = .33, 95\% CI = [.01, 10.17]$.

See Table 1 for response frequencies by condition and Table 2 for participant limit adherence by condition.

Craving to Gamble. First, I conducted a multiple regression with general craving to gamble as the dependent variable and the limit reminder message content manipulation, the ability to discard the message manipulation and their interaction term

as the predictor variables. The omnibus test of the model was not significant, $R^2 = .02$, $F(4, 100) = .55$, $p = .70$. There was neither a main effect of limit reminder message content, $b = .07$, $t = .50$, $p = .62$, 95% CI = [-8.65, 14.44], nor the ability to discard the message, $b = .08$, $t = .59$, $p = .55$, 95% CI = [-7.97, 14.80]. Moreover, there was not a significant interaction effect, $b = -.06$, $t = -.33$, $p = .74$, 95% CI = [-19.13, 13.65].

A second multiple regression was conducted with desire to continue playing slots as the dependent variable and the message content manipulation, the ability to discard the message manipulation and their interaction term as predictors. As with the previous multiple regression, the omnibus test of the model was not significant, $R^2 = .03$, $F(4, 98) = .66$, $p = .62$. The main effects of both message content, $b = -.07$, $t = -.46$, $p = .67$, 95% CI = [-1.14, .71], and ability to discard the message, $b = -.13$, $t = -.90$, $p = .37$, 95% CI = [-1.33, .50], were not significant. As well, there was not a significant interaction effect, $b = .10$, $t = .55$, $p = .59$, 95% CI = [-.95, 1.68].

Discussion

The purpose of Study 2 was to address the methodological limitations of Study 1 in order to better test my general hypothesis that a detailed pop-up message including information about money and credits lost would have better responsible gambling utility compared to a simple pop-up that only informed players that their limit had been reached. To this end, two methodological changes were made. First, to increase the personalization of the message content, participants set their own pre-determined monetary limit. Second, to increase reading of the pop-up message, an inability to immediately discard the pop-up message was added.

Results from Study 2 mimicked those of Study 1. There was no difference in limit adherence between the two limit reminder message content conditions. That is, both limit reminder messages were equally effective at facilitating limit adherence. Moreover, the inability to discard the pop-up message immediately did not facilitate limit adherence. There was also no evidence for the hypothesized interaction between message content and the inability to discard the pop-up message immediately. Gamblers who viewed the more detailed pop-up limit reminder message were not more likely to adhere to their limit when this message was paired with a 10 second temporary delay in play.

Lastly, there was no evidence in support of the Blasczyznski and colleagues' (2016) supposition that pairing responsible gambling messages with temporary delays in a player's ability to gamble would reduce craving. Gamblers who were unable to discard the message for 10 seconds did not have lower levels of craving to gamble compared to those who could discard the message immediately. It could be that the gamblers who could not discard the pop-up message for 10 seconds may have fixated on the countdown timer, which may have created a dissociative (i.e., trance-like) state. Players in such a state may not experience craving to gamble because they are distracted, thus undermining any effect of the ability to discard the message manipulation.

Another potential explanation for the null effect of the ability to discard the message manipulation may be that the temporary delay was not long enough to influence the player's level of craving. In the Blasczyznski and colleagues (2016) study, for example, players were forced to pause their play for three or eight minutes – a timeframe that is significantly longer than the 10 second delay that was used in the current study. It may be that if the players in the current research were unable to discard the pop-up

message for a longer period of time, an effect may have been observed. However, the utility of pop-up message limit reminders lies in the idea that they can help players gamble more responsibly while also being minimally invasive to their play. Although pairing the pop-up message with an inability to discard the message for a period of time longer than 10 seconds may be beneficial for decreasing the player's level of craving, it also increases the invasiveness of the tool. An increase in invasiveness during play would likely be unappealing to players, gambling operators and policy makers despite its potential responsible gambling utility.

In addition to there being no main effect of a temporary delay on craving, message content did not undermine craving to gamble. Gamblers who were unable to discard the pop-up message for 10 seconds and viewed the more detailed message did not have lower levels of craving to gamble compared to those who viewed the simple reminder message. Of importance however, is that although Study 2 addressed the limitations of Study 1, once again a large proportion of participants failed to correctly answer the manipulation check and could not accurately recall the content of the pop-up limit reminder message. The findings of both Study 1 and Study 2 therefore suggest that gamblers do not register nor process the information that is conveyed in pop-up limit reminder messages. If gamblers do not process the pop-up message content, there can be no influence on their limit adherence or their level of craving to gamble.

General Discussion

In today's world, one of the most ubiquitous responsible gambling tools available to the EGM player is one that allows them to set a monetary and/or time limit on their play. When their limit is reached, the player is reminded of such via a pop-up message

(i.e., a text box that appears on the foreground of the EGM during play). Although the option to set a limit and receive a limit reminder pop-up message is commonly available in both online and land-based casinos throughout Canada, there are potential limitations to the way they currently function. Mainly, players are typically told that they have reached their limit, but are not informed of how much money and credits they have lost gambling. By not informing players of their monetary losses, limit adherence may be undermined given that players tend to have difficulty keeping track of their money spent gambling (Wohl et al., 2017). If a player does not have accurate knowledge about how much money he or she has lost, their ability to make informed decisions about their play is compromised, which may lead to excessive play. Thus, in two studies, I tested whether providing players with accurate information about how much money they had lost when their pre-set limit was reached would upregulate limit adherence (compared to simply informing players that their limit was reached).

In two studies, I tested whether limit adherence would be upregulated by providing players with a personalized pop-up message containing detailed information about how much money and credits they had lost gambling when they reached their monetary limit. Results from both studies did not support this general hypothesis. In Study 1, providing players with detailed information about the exact amount of money and credits lost did not result in higher rates of limit adherence compared to a simple limit reminder message. These null findings suggest that informing players about their monetary losses does not influence responsible gambling behaviour. However, of note, is that half of the participants in Study 1 failed to accurately recall the content of the pop-up message. Such a high rate of failure suggests the participants did not read nor register the

information contained in the message. If my intuition that players are not reading the content of the pop-up is correct, additional information provided in the pop-up cannot increase informed decision making.

Methodological limitations of Study 1 should be taken into consideration, however, before drawing strong conclusions about the results. First, players did not set their own monetary limit. Pop-up messages are more effective when the information is self-relevant (Monaghan & Blasczyznski, 2009). Thus, if players determine their own monetary limit, they may be more likely to attend to the information contained in the pop-up message. Second, players could exit out of the pop-up message immediately after it appeared. If they did so, the likelihood that the content of the pop-up message was processed would be low. To address these potential issues with Study 1, a second study was conducted in which 1) all players set their own monetary limit and 2) some participants were unable discard the pop-up message for 10 seconds.

Despite the methodological changes instituted for Study 2, the results of the second study mimicked those of the first. Limit adherence was unaltered by either the limit reminder message manipulation or the ability to discard the message manipulation. Additionally, there was no interaction between the two manipulations. Specifically, in contrast to my hypothesis, pairing a detailed personalized pop-up message containing information about exact money and credits lost with an inability to discard the message for 10 seconds did not result in increased limit adherence (compared to the other conditions).

Importantly, as in Study 1, approximately half of the participants failed to accurately recall the content of the pop-up message. Failure to recall the content of the

message did not differ by condition. Thus, even with the 10 second delay – instituted to increase the likelihood that participants would read and process the content of the message – it would appear that participants were uninterested in the information provided to them in the pop-up. Interestingly, akin to the current results, du Preez, Landon, Bellringer, Garrett, and Abbott (2016) found that approximately half of the participants they interviewed about the efficacy of responsible gambling tools on EGMs reported that they do not read pop-up messages when they appear on EGMs. The results from the current research support the self-report data found by du Preez and colleagues with objective evidence that players do not process information contained in pop-ups. These findings are a disheartening result from a responsible gambling perspective – responsible gambling oriented information provided to players cannot improve their decision making if that information has not been processed.

One possible explanation for why the players did not pay attention to the nuanced information about their monetary losses may be that players often believe they are in control of their spending and know exactly how much they are spending (Auer & Griffiths, in press; Braverman, Tom, & Shaffer, 2014, Wohl et al., 2017; Wohl & Davis, 2017). For such people, the information provided in the pop-up may be deemed redundant with the information they think they already possess. Put another way, players may have registered that the pop-up was a limit reminder message, but then ignored the nuanced content of the message because they felt they were already aware of the information provided. Another possible explanation for the failure to process the nuances in the content of the message is that pop-up messages are ubiquitous in today's advanced technological world. Importantly, these messages are either given a cursory glance or

ignored all together. For example, most people ignore the licensing agreements that pop up when they are installing a new program for their computer (Bakos, Marotta-Wurgler, & Trossen, 2014; Hillman, 2006) and increased disclosure in licensing agreements does little to increase readership (Marotta-Wurgler, 2011). This tendency may generalize to other types of pop-ups, even personally relevant ones like the one used in this study.

Surprisingly, I was not able to increase players' attention to the content of the message by adding an inability to discard the message for 10 seconds. It is possible, however, that the players' attention was drawn to the countdown timer that was located in the bottom right-hand corner of the pop-up dialogue box. Dynamic pop-up messages (i.e., messages that move) are recalled to a greater extent than static messages (i.e., those that simply appear on the screen; Monaghan & Blaszczynski, 2010) because they draw attention. The pop-up used to institute the delay in the players' ability to discard the message contained both a static component (the message) and a dynamic component (the countdown clock). Players' eyes may have been drawn to the dynamic countdown timer instead of the static message. If this was the case, it would not be surprising that players were unable to accurately recall the content of the message. Unfortunately, the current research was not able to empirically assess the players' gaze. It would behoove researchers to test the proposed reasoning using eye-tracking equipment.

Implications

Responsible gambling is built on the theoretical foundation that players should be fully informed about their gambling in order to facilitate positive decision making about their play (e.g., stop playing when one's limit is reached). One way that gambling jurisdictions have sought to increase informed decision making is by providing players

with responsible gambling information via pop-up messages during their play. However, given the high rate of players who did not accurately recall the content of a pop-up message that was observed in the current study, the efficacy of providing players with (nuanced) information in a pop-up message as a method for advancing informed decision making is brought into question. Although there is a large body of empirical evidence that limit-oriented pop-up messages facilitate limit adherence (Auer, Malischnig, & Griffiths, 2014; Auer & Griffiths, 2013; Harris & Griffiths, 2017; Kim et al., 2014; Stewart & Wohl, 2013), it could be that the content of the message is irrelevant to its success. Specifically, players may simply infer that the presence of the pop-up means that their limit has been reached. In this light, changes to the type and content of the message may do little to influence limit adherence. Moreover, it also appears that altering the content of the pop-up message does little for making players more informed about their play. Therefore, pop-up messages are likely not an appropriate vehicle for facilitating informed decision making. Instead, it may be beneficial for responsible gambling researchers and gambling operators to explore other ways to inform players about their gambling.

One potential method to provide players with detailed, personalized information about their play is through their player loyalty account. Loyalty programs in the gambling industry grant players rewards (e.g., free spins, cash back, access to new games) in exchange for money spent gambling (and occasionally for money spent elsewhere in the gambling venue). These programs track information about the player's gambling expenditure over time via their player account card. That is, whenever players use their loyalty card to accumulate points when they gamble, their spending behaviour (e.g., total

dollars gambled, bet size, gambling frequency) is recorded and tracked. This behavioural tracking data has potential responsible gambling utility. Specifically, providing players with their player-account information (e.g., how money they have spent gambling in a specified period of time), may help players to downregulate their gambling behaviour. Wohl and colleagues (2017) found empirical support for this notion. When loyalty program members were told via their player account how much money they had lost gambling over the previous three months, the players decreased their money wagered. Although informing players about their gambling behaviour via their player account appears to be an effective responsible gambling tool, encouraging players to access their player account may be difficult. Indeed, gamblers tend not to access responsible gambling tools on their own accord (Lubman et al., 2015).

One possible way to increase responsible gambling tool use is by providing players with an incentives for engagement. For example, players who are members of a gambling venue's loyalty program could be given rewards points for accessing their personal behavioural profile. It should be noted, however, there may be unintended negative consequences for rewarding players for using responsible gambling tools. When people are incentivized to change their behaviour rather than internally motivated, behavioural change may eventually wane (Gneezy, Meier, & Rey-Biel, 2011). This is because the changed behaviour becomes tied to receiving the reward as opposed to being motivated by a personal desire for growth and change (Promberger & Marteau, 2013). As such, behaviour tends to regress to old patterns when the reward is removed.

In the context of responsible gambling, if the reward structure of the loyalty program was to change so that using responsible gambling tools was no longer rewarded

(or rewarded to a lesser degree), responsible gambling behaviour may wane or cease all together. One way to ameliorate the use of responsible gambling tools may be to capitalize on a variable-ratio reinforcement schedule – the very schedule that contributes to problem gambling. Instead of rewarding players with a specific number of points for setting a limit or watching a responsible gambling educational video, players who set a limit could receive rewards at random intervals. Doing so may maintain players' interest in the tool longer than providing points that eventually lead to a reward or rewarding the player each time they engage with a responsible gambling tool.

Limitations

There were some limitations of note to the current research. First, the duration of the gambling session was short. The players in the current study only had \$10 to gamble with which resulted in a gambling session that was approximately 10 minutes long. Although it is known that gamblers tend to be poor at recalling their gambling expenditure (Auer & Griffiths, in press, Braverman et al., 2014, Wohl et al., 2017), this phenomenon may only occur after a long duration of time has passed. That is, 10 minutes may not be long enough for players to lose track of their gambling expenditure. If players were aware of their spending the additional information about money and credits played would have been rendered pointless because all participants, regardless of condition would already know how many dollars they had lost. However, this likely is not the case because previous research using the same EGM demonstrated that a short, 10-minute gambling session was sufficient to place players into a state of dissociation (Kim et al., 2014, Stewart & Wohl, 2013, Wohl et al., 2014). When players dissociate, they commonly lose track of their spending (Diskin & Hodgins, 1999, 2001; Jacobs, 1988).

Second, participants did not gamble with their own money. I provided them with \$10 in gambling funds. As such, the participants may not have viewed the monetary risks the same way they would have if they were using their own money in a real casino. That said, participants were also given \$10 for participating in the research – funds that were described as unrelated to the funds provided for gambling. Limit adherence was assessed as a function of participants' willingness to use these funds to continue playing. It is likely participants who decided to use this money to continue gambling viewed the money as their own funds. If so, the paradigm used approximated a real world gambling-related decision (i.e., "do I go into my pocket and spend more money gambling?").

Lastly, the reported studies were underpowered. In order to achieve 80% power a sample size of 2000 would have been required for Study 1 and 460 for Study 2. Given that this research is expensive, time consuming, uses the specific population of gamblers and can only be conducted on site, recruiting the required number of participants would not have been possible. Gambling studies are often underpowered due to the difficulties that are associated with conducting community based research with a special population. As such, caution should be exercised when interpreting the results.

Conclusion

In the current paper, the results from two studies suggest that reminding gamblers that their limit has been reached with the added information about exact money and credits lost is not more effective at causing limit adherence than simple reminder messages. Moreover, lack of efficacy is not improved by pairing the limit reminder pop-up messages with an inability to immediately discard the message. Of particular importance however, was that in both studies nearly half of the gamblers could not

correctly recall the content of the pop-up message reminder. Thus, the null results may be a function of players not paying attention to the information they are provided. They may simply recognize that their limit has been reached (by virtue of receiving the pop-up message), and ignore the content of the message they are provided. As such, pop-up messages may not be an appropriate vehicle to provide players with nuanced information that could help to improve their gambling-related decision making.

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List of Tables

Table 1

Frequency of responses to the manipulation check by condition for Studies 1 and 2.

| | I was NOT reminded when my limit was reached | I was ONLY told I reached my limit | I was reminded I reached my limit INCLUDING number of credits played AND how much money I lost |
|-----------------------------------|--|------------------------------------|--|
| Study 1 | | | |
| Simple Message | 3 (5.1%) | 36 (61%) | 20 (33.9%) |
| Detailed Message | 5 (7.7%) | 32 (49.2%) | 28 (43.1%) |
| Study 2 | | | |
| Simple Message, Temporary Delay | 0 (0%) | 14 (56.0%) | 11 (44.0%) |
| Simple Message, No Delay | 2 (6.7%) | 19 (63.3%) | 9 (30.0%) |
| Detailed Message, Temporary Delay | 2 (7.1%) | 10 (35.7%) | 16 (57.1%) |
| Detailed Message, No Delay | 0 (0%) | 10 (38.5%) | 16 (61.5%) |

Table 2.

Demographics, gambling characteristics and limit adherence by condition for Study 2.

| | Temporary Delay, Detailed Message (<i>n</i> = 28) | Temporary Delay, Simple Message (<i>n</i> = 25) | No Delay, Detailed Message (<i>n</i> = 26) | No Delay, Simple Message (<i>n</i> = 30) | <i>p</i> |
|------------------------------------|--|--|--|--|----------|
| Mean (SD) Age | 61.54 (12.07) | 57.17 (15.67) | 57.08 (16.60) | 60.21 (14.09) | .61 |
| Mean (SD) PGSI | 2.14 (3.92) | 2.96 (5.62) | 2.33 (3.23) | 1.71 (2.17) | .71 |
| Mean (SD) Years gambled | 15.30 (8.84) | 13.84 (9.91) | 11.71 (10.57) | 15.81 (10.96) | .47 |
| Mean (SD) Monetary limit set | 9.14 (1.67) | 8.46 (2.56) | 8.31 (2.48) | 8.87 (2.18) | .50 |
| % Male | 46.4 | 33.3 | 16.0 | 51.7 | .04 |
| % Failed Manipulation check | 42.9 | 44.0 | 38.5 | 36.7 | .94 |
| % who Adhered to their limit | 96.4 | 84.0 | 92.3 | 93.3 | .52 |

Appendix A: Recruitment Script

Hi, my name is _____ and I am with a team of researchers from Carleton University. Would you be interested in participating in a study about your gambling beliefs and behaviours?

First, I must ask you if you are 19 or over?

[If yes, continue; If no, state that only those 19 years old or over are eligible to participate. Thank them for their time]

Have you gambled at all today?

[If no, continue; if yes, state that only people who have not yet gambled that day are eligible to participate. Thank them for their time.]

Are you here to play slots?

[If yes, continue; if no, state that only people here to play slots are eligible to participate. Thank them for their time.]

Are you currently, or have you ever sought treatment for your gambling behaviour?

[If no continue, if yes, state that only people who have never previously sought treatment for their gambling are eligible to participate. Thank them for their time.]

This study will have you gamble in a virtual setting, using a laptop, and will ask you to complete two surveys about your gambling beliefs and behaviours. The survey will take about 10 min to complete. The length of time in the study, however, will be dependent on how long you want to gamble on the VR casino. You will be given a \$10 gift card for your participation and \$10 worth of credits to play with in the virtual casino. You can use as little or as much of the \$10 worth of credits you would like, and anything you win, you can keep in the form of gift cards to Tim Horton's.

Please note the Carleton University Ethics Board-B has approved this this study

If the participant is not interested, thank them for their time.

Appendix B: Explanation of Study 1

Thank you for your interest in our study! Before you begin gambling in the virtual reality casino, there are a few things I would like to explain. First, in this session you will be gambling on the virtual reality slot machines and will have the opportunity to win money, depending upon the outcome of the spins. We have uploaded 20 dollars into this machine. Of this 20 dollars, 10 dollars is for you to gamble with on the slots and 10 dollars is for your participation in this study. In other words, you will have 40 credits to gamble with. You will be allowed to trade in any remaining credits at the end of the session for money onto a Tim Horton's gift card, which you will be allowed to keep. You may gamble as long as you want or until all of your credits are gone. You can bet up to 3 credits per spin. Lastly, know that we set the odds of winning in consultation with the Ottawa and Gatineau casinos (the Rideau-Carleton Raceway and Lac Leamy Casino). That is, the odds of winning in this casino are the same as those in real casinos. After you complete a short survey online you will be directed to the virtual reality casino and can begin gambling. When you have finished gambling, you will be asked to complete another short survey.

Appendix C: Informed Consent for Study 1

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #15-254) and the University of Winnipeg Human Research Ethics Board. Ethics expiration date: 31/12/2018.

This research has been funded by the Manitoba Gambling Research Program.

Present study: Virtual Casino Gambling

Research personnel. The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Dr. Michael Wohl (Principal Investigator, email: michael.wohl@carleton.ca, phone: 613-520-2600 ext 2908), Dr. Diane Santesso (Principal Investigator, email d.santesso@uwinnipeg.ca, phone [REDACTED]). Samantha Hollingshead (Other research personnel, email: sam.hollingshead@carleton.ca), Travis Sztainert (Other research personnel, email: travis.sztainert@carleton.ca), Danay Novoa (Other research personnel, email: danay.novoa@carleton.ca) or Carina Daugherty (Other research personnel, carina.daugherty@carleton.ca).

Concerns. Should you have any ethical concerns about this research, please contact Dr. Shelly Brown at Shelley.Brown@carleton.ca, 613-520-2600 ext. 1505 (*Carleton University Research Ethics Board-B Chair*) or the Carleton University Research Office (ethics@carleton.ca). You may also contact Heather Mowat at h.mowat@uwinnipeg.ca, 204-786-9058 (University of Winnipeg Program **Officer, Research Implementation and Ethics**).

Purpose. The purpose of the study is to examine your gambling behaviour while playing in a virtual casino.

Task requirements. We will be asking you to gamble in a virtual reality casino using a laptop. Additionally, we will be asking you to complete a survey online asking you about your background (e.g., demographics), your gambling (e.g., behaviour and beliefs). This study will take approximately 20 minutes to complete.

Benefits/compensation. We are offering you a \$10 gift card for participation and \$10 to play with in the virtual casino, in which anything you win of that \$10 you can keep in the form of Tim Horton's gift card.

Potential risk/discomfort. There are no physical risks involved in this study. Some individuals might feel uncomfortable when asked to reflect on their gambling behaviors.

If you feel any discomfort or distress, you may choose *not* to answer specific questions, and you will not be penalized in anyway if you do this.

Right to withdraw. Your participation in this study is entirely voluntary. At any point during the study, you have the right to not complete certain questions, or to withdraw without penalty. If you withdraw, you have the right to request that your data be deleted. If you would like to withdraw your data, please email one of the researchers and provide them with the code given to you on your debriefing. The researcher will then delete any record of your participation in the study as well, as the email you sent. You will have until the end of the study to request that your data be deleted. Once the study is complete, the codes will not be associated with data, as such, the researchers will have no way of identifying your responses and therefore, will not be able to delete them. If you would like to withdraw from the study and NOT have your data deleted, simply follow the withdraw instructions stated below. You will not need to email the researcher.

To withdraw, please tell any of the researchers present that you would no longer wish to participate in the study.

Anonymity/Confidentiality: The data collected in this study are confidential. There will be no identifying information attached to your data. The coded data are made available only to the researchers associated with this project.

The survey data will be collected through the software Qualtrics, which uses servers with multiple layers of security to protect the privacy of the data (e.g., encrypted websites and pass-word protected storage). Please note that Qualtrics is hosted by a server located in the USA. The United States Patriot Act permits U.S. law enforcement officials, for the purpose of an anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without that person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality and anonymity of your data. With your consent to participate in this study you acknowledge this.

I have read the above description of the study concerning my reactions to virtual gambling. The data collected will be used in research publications and/or for teaching purposes. My signature indicates that I agree to participate in the study, and this in no way constitutes a waiver of my rights.

Full Name (please print): _____
 Participant Signature: _____
 Date: _____
 Researcher Signature: _____
 Date: _____

Appendix D: Demographics

1. What is your age?

2. What is your gender?
 - a. Female
 - b. Male
3. How often do you gamble?
 - a. More than once a day
 - b. More than once a week
 - c. More than once a month
 - d. More than once every 3 months
 - e. Less than once every 3 months
4. How long have you gambled for? (Please answer in years, then months)

5. What is your favourite form of gambling (e.g., cards, sports betting, slot machine gambling, horse racing, lottery tickets, etc)?

6. When you gamble, how much money do you spend on average?

7. When you gamble, how many hours do you typically spend in a given session?

8. Where do you typically gamble (e.g., home/internet, casino, etc.)?

Appendix E: Limit Adherence Measure for Study 1

Now that you have spent your \$20 worth of credits, would you like to use any of your participation money that remains in the machine to keep playing?

- a. Yes
- b. No

Please explain: _____

Appendix F: Manipulation Check

What message did you receive when you reached your limit?

- a. I was NOT reminded when my limit was reached
- b. I was told I reached my limit INCLUDING number of credits played AND how much money I played
- c. I was ONLY told I reached my limit.

Appendix G: Problem Gambling Severity Index (Ferris & Wynne, 2001)

In the past 12 months how often ...

1. Have you bet more than you could really afford to lose?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

2. Have you needed to gamble with larger amounts of money to get the same feeling of excitement?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

3. Have you gone back another to try and win back the money you lost?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

4. Have you borrowed money or sold anything to get money to gamble?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

5. Have you felt that you might have a problem with gambling?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

6. Have you felt that gambling has caused you any health problems, including stress or anxiety?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

7. Have people criticized your betting or told you that you have a gambling problem, whether or not you thought it is true?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

8. Have you felt your gambling has caused financial problems for you or your household?

| | | | |
|----------|-----------|------------------|---------------|
| 0 | 1 | 2 | 3 |
| Never | Sometimes | Most of the time | Almost Always |

9. Have you felt guilty about the way you gamble or what happens when you gamble?

| 0 | 1 | 2 | 3 |
|----------|-----------|------------------|---------------|
| Never | Sometimes | Most of the time | Almost Always |

Appendix H: Debriefing for Study 1

Thank you for participating in this study! This information is provided to inform you of the exact nature of the study you just participated in.

What are we trying to learn in this research?

Currently, slot machines can be programmed to inform (via pop-up message) that they are approaching or have reached their spending and/or time limit. The type of information given to the player (e.g., credits, money, time) has not been studied in research. In this study, some people were informed about their play in terms of how many credits had been played. Other people were informed about their play in terms of how many credits had been played as well as how much money had been spent. People who were informed about credits and money played were also given access to money lost/won and elapsed time throughout the course of play by using the F7 key. The purpose of this study was to see whether type of information provided would be effective at helping people adhere to their limit.

The outcomes on the slot machine you just played were predetermined to win or lose in a particular sequence. We were unable to disclose this part of the study to you at the onset because it would have influenced your behaviour and responses to the questions. As such, after you read this debriefing form, the experimenter will present a new informed consent form. The purpose of an informed consent is to ensure that you now understand the true purpose of the study and that you agree to allow your data to be used for research and teaching purposes. Because you were only told of the procedures and not the purpose of this study at the outset, we will be asking you for your consent to allow your data to be used for research and teaching purposes.

In terms of the questionnaire that you completed, we asked you if you would like to continue playing with your participation money, for the purposes of this study, we were only interested in whether people would be willing to continue playing and exceed their limit. In actuality, no participants were allowed to keep playing and everyone received a \$20 gift card as compensation. We also asked you to complete items to assess whether the reason why you gamble (e.g., for financial gain) or whether you lost track of time (i.e., dissociate) while gambling influences your behaviour.

Why is this important to scientists or the general public?

When players are reminded of their money and/or time limit they are able to make more informed decisions about whether or not they would like to continue to gamble and adhere to their preset limits. Responsible gambling may increase (i.e., limit adherence) when a limit reminder is provided throughout the session in various forms.

What if I have questions later?

If you have any questions or comments about this research, then please feel free to contact Dr. Michael Wohl (Principal Investigator, email: michael.wohl@carleton.ca, phone: 613-520-2600 ext 2908) or Dr. Diane Santesso (Co-Principal Investigator, email: d.santesso@uwinnipeg.ca, phone 204-988-7536. Samantha Hollingshead (Other research personnel, email: sam.hollingshead@carleton.ca), Travis Sztainert (Other research personnel, email: travis.sztainert@carleton.ca), Danay Novoa (Other research personnel, email: danay.novoa@carleton.ca) or Carina Daugherty (Other research personnel, carina.daugherty@carleton.ca). .

Should you have any ethical concerns about this research, please contact Dr. Shelly Brown at Shelley.Brown@carleton.ca, (613) 520-2600 ext. 1505 (*Carleton University Research Ethics Board-B Chair*) or the Carleton University Research Office (ethics@carleton.ca). You may also contact Heather Mowat at h.mowat@uwinnipeg.ca, 204-786-9058 (University of Winnipeg Program **Officer, Research Implementation and Ethics**).

If you are interested in learning more about pop-up messages and limit setting, please see the following articles:

Auer, M., Malischnig, D., & Griffiths, M. (2014). Is “pop-up” messaging in online slot machine gambling effective as a responsible gambling strategy? *Journal of Gambling Issues*, 29, 1-10.

Stewart, M. J., & Wohl, M. J. (2013). Pop-up messages, dissociation, and craving: How monetary limit reminders facilitate adherence in a session of slot machine gambling. *Psychology of Addictive Behaviors*, 27, 268-273.

If you would like to talk with someone about your gambling behaviour, please use any of the following numbers:

Sandy Hill Community Health Center: Addiction and Mental Health Services
(613) 789- 8941

Gambler’s Anonymous Ottawa:
(613) 567 -3271

Ontario Problem Gambling Helpline:
1 (888) 230- 3505

Manitoba *Problem Gambling Helpline*
1 (800) 463-1554

Thank you for participating in this study! Your assistance will help us better understand limit reminders and responsible gambling behaviour. We greatly appreciate your participation, but we ask that you refrain from discussing this study with potential participants as their responses may be influenced if they are privy to the purpose of the study.

This study has received clearance by the Carleton University Research Ethics Board-B and the University of Winnipeg Research Ethics Board. Ethics Expiration date: 31/12/2018.

This research has been funded by the Manitoba Gambling Research Program.

Appendix I: Informed Consent to the use of Data for Study 1

The purpose of an informed consent is to ensure that you now understand the true purpose of the study and that you agree to allow your data to be used for research and teaching purposes. Because you were only told of the procedures and not the purpose of this study at the outset, we are now asking for your consent to allow your data to be used for research and teaching purposes.

This study has received clearance by the Carleton University Research Ethics Board-B and the University of Winnipeg Research Ethics Board (Reference #15-254). Ethics expiration date: 31/12/2018.

This research has been funded by the Manitoba Gambling Research Program.

Purpose. The purpose of this study is to assess whether the various money and time pop-up messages influences limit adherence.

Anonymity/Confidentiality. The data collected in this study are kept anonymous and confidential. The consent forms are kept separate from your responses.

Right to withdraw data. You have the right to indicate that you do not wish your data to be used in this study. If you indicate this is your choice, then all measures you have provided will be destroyed.

Signatures: I have read the above description of the study investigating the effectiveness of monetary limit pop-up reminders. The data in the study will be used in research publications or for teaching purposes. My signature indicates that I agree to allow the data I have provided to be used for these purposes.

Full Name (Print): _____
 Participant Signature: _____
 Date: _____
 Researcher Signature: _____
 Date: _____

Appendix J: Informed Consent for Study 2

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #105977).

This research has been funded by the Ontario Problem Gambling Research Centre.

ELIGIBILITY: All participants must be at least 19 years of age, have not gambled yet today and be at the casino venue to play slots.

Present study: Virtual Casino Gambling

Research personnel. The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Dr. Michael Wohl (Principal Investigator, email: michael.wohl@carleton.ca, phone: 613-520-2600 ext 2908), Samantha Hollingshead (Other research personnel, email: sam.hollingshead@carleton.ca), Adrienne Paynter (Other research personnel, email: Adrienne.paynter@carleton.ca), Fiona Cooligan (Other research personnel, email: Fiona.cooligan@carleton.ca), Monique Amar (Other research personnel, email: monique.amar@carleton.ca) or Colleen Mahoney (Other research personnel, email: colleen.mahoney@carleton.ca).

Concerns. Should you have any ethical concerns about this research, please contact the Carleton University Research Office or Andy Adler, Chair, CUREB-B (613-520-2600 ext. 4085; email: ethics@carleton.ca).

Purpose. The purpose of the study is to examine your gambling behaviour while playing in a virtual casino.

Task requirements. We will be asking you to gamble in a virtual reality casino using a laptop. Additionally, we will be asking you to complete a survey asking you about your background (e.g. demographics), your gambling (e.g., behaviour and beliefs). The survey will take about 15 min to complete. The length of time in the study, however, will be dependent on how long you want to gamble on the VR casino.

Benefits/compensation. We are offering you a \$10 gift card for participation and \$10 to play with in the virtual casino, in which anything you win of that \$10 you can keep in the form of Tim Horton's gift card.

Potential risk/discomfort. There are no physical risks involved in this study. Some individuals might feel uncomfortable when asked to reflect on their gambling behaviors.

If you feel any discomfort or distress, you may choose *not* to answer specific questions, and you will not be penalized in anyway if you do this.

Right to withdraw. Your participation in this study is entirely voluntary. At any point during the study, you have the right to not complete certain questions, or to withdraw without penalty. If you withdraw, you have the right to request that your data be deleted. If you would like to withdraw your data during the session, please inform the experimenter. If, after participating, you decide you want your data withdrawn, please email one of the researchers identified on the debriefing form. The researcher will then delete any record of your participation in the study as well, as the email you sent. You will have until the end of the study (August 31, 2017) to request that your data be deleted. Once the study is complete, all identifying information will be deleted and thus the researchers will have no way of identifying your responses. In this situation, the researcher will not be able to delete your data. If you would like to withdraw from the study and NOT have your data deleted, simply follow the withdraw instructions stated below.

To withdraw, please tell any of the researchers present that you would no longer wish to participate in the study.

Anonymity/Confidentiality: The data collected in this study are confidential. There will be no identifying information attached to your data. The coded data are made available only to the researchers associated with this project. There will be no way for anyone reading the results of this study to be able to link any data with your name or student number. PSEUDONYMS WILL ALWAYS BE USED in any publications that may result from this study, as well as in the stored data. If you withdraw from participation as a participant at a later date, all data of any kind will be erased and/or destroyed.

Data Storage and Sharing. The data will be stored on password protected computers of the researchers and research assistants involved with this project. As there will be no personal information associated with the data, this dataset will be stored electronically and kept indefinitely. Additionally, we will upload this anonymized data set to an online data repository called Open Science Framework (<https://osf.io/>) for research and teaching purposes. Data is stored in OSF in perpetuity. Anonymized data may also be shared with trusted colleagues. Lastly, anonymized data may be used for publication and presentation purposes, in which case only aggregate data will be presented.

I have read the above description of the study concerning my reactions to virtual gambling. The data collected will be used in research publications and/or for teaching purposes. My signature indicates that I agree to participate in the study, and this in no way constitutes a waiver of my rights.

Full Name (please print): _____

Participant Signature: _____

Date: _____

Researcher Signature: _____

Date: _____

Appendix K: Explanation of Study 2

Thank you for your interest in our study! Before you begin gambling in the virtual reality casino, there are a few things I would like to explain. First, in this session you will be gambling on the virtual reality slot machines and will have the opportunity to win money, depending upon the outcome of the spins. In this casino you can bet up to 3 credits per spin and we want to let you know that we set the odds of winning in consultation with the Ottawa and Gatineau casinos (the Rideau-Carleton Raceway and Lac Leamy Casino). That is, the odds of winning in this casino are the same as those in real casinos.

Now I am going to talk about how the Virtual Reality slot machine gambling session will work.

First, 20 dollars (which equals 80 credits) have been added to this machine.

You can gamble with as much as \$10 of this amount, which equals a 40 credits max.

However, you don't need to use all \$10. You could set a limit of say \$8. If you lost that \$8 we will add the remaining \$2 to the amount of money we give you for participating.

Of course, this is gambling, so you could also win money.

Any amount of money you have at the end of the session will be converted to into a Tim Horton's gift card, which you will be allowed to keep.

You can gamble as long as you want.

Of course, if you lose all your money, the session will come to an end. Does this make sense?

[If no explain further]

[If yes] Great! **How much of the \$10 in gambling money we are giving you would you like to play with?**

(Make a note)

After you complete a short survey online you will be directed to the virtual reality casino and can begin gambling. When you have finished gambling, you will be asked to complete another short survey.

Appendix L: Limit Adherence Measure for Study 2

In this casino we have a lot of different games, such as, different slot machines, poker and at the back we have blackjack and poker tables. Now that you have played your \$10 on the slot machine, would you like to use your participation money to gamble on any of the other games?

- a. Yes
- b. No

Would you please explain your decision?

Appendix M: Craving Measure for Study 2

General Craving

How would you rate your desire to gamble?

With “0” meaning “no desire to gamble at all” and “100” meaning an “overwhelming desire to gamble”, please make a tick anywhere along the line below and write the corresponding numeric value here: _____



Desire to Continue Gambling

Please use the scale below to rate your agreement to the following statements about your desire to gamble **today at the Rideau Carleton Raceway**:

| | | | | | | |
|--------------------------|-----------------|--------------------------|----------------|-----------------------|--------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Strongly Disagree | Disagree | Somewhat Disagree | Neutral | Somewhat Agree | Agree | Strongly Agree |

| | | | | | | | | |
|---|--|---|---|---|---|---|---|---|
| 1 | I have a strong desire to play on a slot machine right now at the Rideau Carleton Raceway. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | I have an urge to gamble right now at the Rideau Carleton Raceway. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3 | Please leave this item blank. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4 | At the moment, I lost my desire to gamble today at the Rideau Carleton Raceway. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix N: Debriefing for Study 2

Thank you for participating in this study! This information is provided to inform you of the exact nature of the study you just participated in.

What are we trying to learn in this research?

Currently, slot machines can be programmed to inform players (via pop-up message) that they are approaching or have reached their spending and/or time limit. The type of information given to the player (e.g., credits, money, time) has not been studied in research. In this study, some people were simply informed that their limit had been reached while other people were informed about their play in terms of how many credits had been played as well as how much money had been spent. Additionally, some players were forced to view the pop-up message reminder for 10 seconds while others were not. The purpose of this study was to see whether type of information provided paired with forced breaks in play of 10 seconds would be effective at helping people adhere to their limit.

The outcomes on the slot machine you just played were predetermined to win or lose in a particular sequence. We were unable to disclose this part of the study to you at the onset because it would have influenced your behaviour and responses to the questions. As such, after you read this debriefing form, the experimenter will present a new informed consent form. The purpose of an informed consent is to ensure that you now understand the true purpose of the study and that you agree to allow your data to be used for research and teaching purposes. Because you were only told of the procedures and not the purpose of this study at the outset, we will be asking you for your consent to allow your data to be used for research and teaching purposes.

In terms of the questionnaire that you completed, we asked you if you would like to continue playing with your participation money, for the purposes of this study, we were only interested in whether people would be willing to continue playing and exceed their limit. In actuality, no participants were allowed to keep playing and everyone received a \$20 gift card as compensation. We also asked you to complete items to assess whether the reason why you gamble (e.g., for financial gain) or whether you lost track of time (i.e., dissociate) while gambling influences your behaviour.

Why is this important to scientists or the general public?

When players are reminded of their money and/or time limit they are able to make more informed decisions about whether or not they would like to continue to gamble and

adhere to their preset limits. Responsible gambling may increase (i.e., limit adherence) when a limit reminder is provided throughout the session in various forms.

What if I have questions later?

If you have any questions or comments about this research, then please feel free to contact Dr. Michael Wohl (Principal Investigator, email: michael.wohl@carleton.ca, phone: 613-520-2600 ext 2908), Samantha Hollingshead (Other research personnel, email: sam.hollingshead@carleton.ca), Adrienne Paynter (Other research personnel, email: Adrienne.paynter@carleton.ca), Fiona Cooligan (Other research personnel, email: Fiona.cooligan@carleton.ca), Monique Amar (Other research personnel, email: monique.amar@carleton.ca) or Colleen Mahoney (Other research personnel, email: colleen.mahoney@carleton.ca).

Should you have any ethical concerns about this research, please contact the Carleton University Research Office or Andy Adler, Chair, CUREB-B (613-520-2600 ext. 4085; email: ethics@carleton.ca).

If you are interested in learning more about pop-up messages and limit setting, please see the following articles:

Auer, M., Malischnig, D., & Griffiths, M. (2014). Is “pop-up” messaging in online slot machine gambling effective as a responsible gambling strategy? *Journal of Gambling Issues*, 29, 1-10.

Stewart, M. J., & Wohl, M. J. (2013). Pop-up messages, dissociation, and craving: How monetary limit reminders facilitate adherence in a session of slot machine gambling. *Psychology of Addictive Behaviors*, 27, 268-273.

If you would like to talk with someone about your gambling behaviour, please use any of the following numbers:

Sandy Hill Community Health Center: Addiction and Mental Health Services
(613) 789- 8941

Gambler’s Anonymous Ottawa:
(613) 567 -3271

Ontario Problem Gambling Helpline:
1 (888) 230- 3505

Thank you for participating in this study! Your assistance will help us better understand limit reminders and responsible gambling behaviour. We greatly appreciate

your participation, but we ask that you refrain from discussing this study with potential participants as their responses may be influenced if they are privy to the purpose of the study.

This study has received clearance by the Carleton University Research Ethics Board-B.

This research has been funded by the Ontario Problem Gambling Research Centre.

Appendix O: Informed Consent to the use of Data for Study 2

The purpose of an informed consent is to ensure that you now understand the true purpose of the study and that you agree to allow your data to be used for research and teaching purposes. Because you were only told of the procedures and not the purpose of this study at the outset, we are now asking for your consent to allow your data to be used for research and teaching purposes.

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #105977).

This research has been funded by the Ontario Problem Gambling Research Centre

Purpose. The purpose of this study is to assess whether the various money and time pop-up messages influences limit adherence.

Anonymity/Confidentiality. The data collected in this study are kept anonymous and confidential. The consent forms are kept separate from your responses.

Right to withdraw data. You have the right to indicate that you do not wish your data to be used in this study. If you indicate this is your choice, then all measures you have provided will be destroyed.

Signatures: I have read the above description of the study investigating the effectiveness of monetary limit pop-up reminders. The data in the study will be used in research publications or for teaching purposes. My signature indicates that I agree to allow the data I have provided to be used for these purposes.

Full Name (Print): _____
 Participant Signature: _____
 Date: _____
 Researcher Signature: _____
 Date: _____