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Moving Disordered Gamblers Toward Change: Implicit Theories Moderate the Indirect
Relationship from Self-Discontinuity to Attempted Change through Nostalgia

by

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Abstract

The present study employed a longitudinal design to test a moderated-mediation model of attempted change among disordered gamblers. Specifically, self-discontinuity (i.e., feeling that gambling has fundamentally changed the self) was expected to lead to attempted change through feelings of nostalgia for the pre-addicted self. Moreover, this indirect relationship was hypothesized to be conditional upon gamblers' implicit theories of behaviour (i.e., malleable versus stable). To this end, a community sample of disordered gamblers (N = 243) completed measures of self-discontinuity, nostalgia, implicit theories, and readiness to change. Three months later, participants were asked whether they had made an attempt to change their gambling behaviour since the initial session. As expected, self-discontinuity lead to attempted change through nostalgia, but only for gamblers who believed that behaviour was malleable, as opposed to stable. As few disordered gamblers attempt to change their behaviour, these findings are important in promoting positive behavioural change.

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Moving Disordered Gamblers Toward Change: Implicit Theories Moderate the Indirect Relationship from Self-Discontinuity to Attempted Change through Nostalgia

Behaviour change is hard, even when that behaviour is yielding negative outcomes. For example, when a gambler experiences significant monetary loss, objectively that gambler should recognize their gambling behaviour is problematic and take action to change. However, only 6 to 12% of disordered gamblers ever take action to change their behaviours (see Slutske, 2014; Suurvali, Hodgins, Tonneatto, & Cunningham, 2008). These low rates are troubling given that monetary loss is but one of the many consequences associated with disordered gambling (see Lesieur & Custer, 1984; Petry, 2005). With that said, some disordered gamblers do muster the courage to change. Curiously, there is a paucity of empirical research on what leads people who engage in addictive behaviours in general, and disordered gambling in particular, to initiate change.

Clinical observations may provide some clues for how to motivate change. Miller and Rollnick (2002), for example, suggested that readiness to change can be motivated by heightening the discrepancy between the current self and the self that existed before addiction entered the client's life. In an empirical test of this supposition, Kim and Wohl (2015) found that readiness to change was increased among disordered gamblers, as well as problem drinkers, when feelings of self-discontinuity (i.e., the sense that one's addictive behaviours had fundamentally changed core aspects of the self) were heightened. Importantly, this effect was mediated by nostalgic reverie for the pre-addicted self. A significant limitation of this study, however, was that they did not assess whether

participants subsequently engaged in behavioural change. Thus, it is possible that although a sense of self-discontinuity motivates readiness to change, it does not have sufficient power to motivate action to change. It has long been known that attitudes (about change) are not necessarily predictive of behaviour (to change). In the current research, I tested the predictive utility of self-discontinuity-induced nostalgia for motivating an attempt to change.

Additionally, I assessed whether a source of disjoint between intention (i.e., readiness) to change and taking action to change is people's implicit theories of human behaviour. According to Dweck (1996), people differ in the extent to which they believe human behaviour is malleable. People who are ready for change may be more likely to make an attempt to change if they believe human behaviour is malleable (i.e., incremental theorist) as opposed to fixed (i.e., entity theorist). The present research addressed this limitation by employing a moderated-mediation model to assess attempted behavioural change in a sample of disordered gamblers. It was expected that feelings of self-discontinuity (as a result of one's gambling) would heighten feelings of nostalgia for the past self, before disordered gambling entered one's life. This nostalgia, in turn, should increase the gambler's likelihood of attempting change. However, this indirect relationship should only hold among gamblers who hold the mindset that behaviour is malleable, as opposed to fixed. To test these ideas, a longitudinal design was employed.

Disordered Gambling and Behavioural Change

Gambling has become a normalized recreational activity in Canada. Indeed, in a 2007/2008 survey, approximately 66% of the Ontario population reported having engaged in gambling activities in the past year (Toronto Public Health, 2012) – the

majority of whom gambled as a recreational activity with moderate financial (and time) loss. With that said, a small percentage become addicted and develop disordered gambling behaviours. Specifically, epidemiological studies suggest that approximately 1.6% of the general public experience problems due to their disordered gambling behaviour, with an additional 3.85% of people indicating problems at the sub-clinical level (Shaffer, Hall, & Vander Bilt, 1999). People who gamble in a disordered manner tend to a) be preoccupied with gambling, b) need to gamble with increasingly large sums of money to achieve the desired levels of excitement, and c) chase losses (American Psychological Association [APA], 2013). Moreover, their disordered patterns of play are typically associated with an array of physical, psychological, and interpersonal harms (Lesieur & Custer, 1984; Petry, 2005).

Despite the significant harms disordered gambling can yield, disordered gamblers are relatively unwilling to change their behaviour, resulting in continued or escalated harm (Lesieur & Custer, 1984). This is evidenced by the remarkably low rate of change (6%) – a rate that includes the use of treatment services as well as self-help avenues (Suurvali et al., 2008). These alarmingly low rates of change call for the identification of factors that promote positive behavioural change among people engaging in disordered gambling. Unfortunately, little empirical attention has been placed on the factors that move people toward action to change. Rather, much of the focus on behavioural change has been placed on the behavioural and cognitive components of change, or *how* people change, rather than *why* they change.

One model that has demonstrated utility in describing how people move towards change is the transtheoretical model of behaviour change (TTM; DiClemente et al.,

1991). The TTM details the behavioural components of change, allowing its applications to extend to a wide range of addictive behaviours, among which include smoking (Andersen, Keller, & McGowan, 1999; DiClemente et al., 1991) and excessive drinking (Carbonari & DiClemente, 2000). Importantly for the current research, the TTM appropriately describes the process of behavioural change among disordered gamblers (DiClemente, Story, & Murray, 2000; Hodgins, 2001).

According to the TTM, there are five stages of behavioural change: precontemplation, contemplation, preparation, action, and maintenance (DiClemente et al., 1991). In the precontemplation stage, people are not thinking about change. These gamblers are often unaware that their behaviour needs change and lack awareness of the harms associated with continued engagement in disordered gambling. The contemplation stage is composed of people who are thinking about change, but are not quite ready to make a change. These gamblers generally begin to recognize the harms of their behaviour, but plan to initiate change in the less immediate future. In the preparation stage, gamblers are ready to engage in change, but have yet to take definitive action in initiating such change. Gamblers who then take action and are actively modifying their behaviour are said to be in the action stage. Lastly, those who have successfully modified their behaviour for at least six months are said to be in the maintenance stage. Thus, the early stages of the TTM characterize the process of readying oneself for change, whereas the later stages characterize the process of change itself.

Although research suggests that gamblers in the later stages of the TTM (i.e., preparation) are more likely to take action than are gamblers in the earlier stages of the TTM (i.e., precontemplation; Ledgerwood et al., 2013), change does not necessarily

occur in a linear fashion (Prochaska, DiClemente, & Norcross, 1992). For example, gamblers may move back and forth between contemplation and preparation a number of times before action is initiated. Moreover, it is also possible for gamblers to rush into action without contemplation or preparation. According to the TTM, whether people move closer to or farther away from action is a function of the extent to which the perceived harms (or cons) of engaging in the addictive behaviour outweigh the benefits (or pros; see Velicer, DiClemente, Prochaska, & Brandenburg, 1985). Unfortunately, the literature is relatively silent on what factors facilitate shifts in this balance. In the current research, I examined a relatively novel avenue for motivating change: the gambler's sense of self-discontinuity.

Self-Discontinuity as a Catalyst for Change

Negative experiences can bring about relatively aversive states and disconnect people from who they once were (Iyer & Jetten, 2011). Indeed, past research has shown that self-discontinuity (i.e., the sense that the current self is fundamentally different from the past self) can be a psychologically distressing state (Lampinen, Odegard, & Leding, 2004; Sani, 2008). For example, feelings of self-discontinuity are associated with negative affect, anxiety, and instability (see Spears, 2008). Furthermore, self-discontinuity can hinder people from acting in ways that can benefit their present and future selves (Chandler, Lalonde, Sokol, Hallett, & Marcia, 2003). Thus, self-discontinuity is generally characterized as an aversive state of being (Chandler & Proulx, 2008; Iyer & Jetten, 2011). However, self-discontinuity may hold motivational properties for people engaging in disordered gambling.

Indeed, addiction often results in negative changes to people's moods, behaviours, and self-esteem (Bergh & Kühnhorn, 1994; Lesieur & Custer, 1984). These changes, in turn, may lead people to foster feelings of self-discontinuity. Nuske and Hing (2013), for example, noted that narratives from disordered gamblers who were attempting behavioural change often comprised themes of self-discontinuity. Specifically, gamblers perceived a fundamental discrepancy between their current self and their past self, before the addiction took hold. Participants had generally come to dislike their current, addicted self, and viewed their past self as more favourable. Importantly for the current research, perceiving this discrepancy between past and present selves was noted as one of the critical points on the pathway to recovery. Thus, highlighting self-discontinuity may be an important catalyst for change among disordered gamblers. Indeed, Kim and Wohl (2015) found that disordered gamblers who were manipulated to feel more self-discontinuous as a result of their gambling reported being more ready for behavioural change.

Miller and Rollnick (2002) have also noted that people who engage in addictive behaviours tend to experience distress once they become aware of how their current harmful behaviours are incongruent with their self-concept – one of the cornerstones of a therapeutic approach called motivational interviewing (MI). Theory and research on cognitive dissonance (i.e., the psychological state of having; Festinger, 1957; Harmon-Jones, Amodio, & Harmon-Jones, 2009) supports the notion that people experience distress when they hold inconsistent thoughts, beliefs, or attitudes, especially in relation to behavioural decisions and change. The distress experienced from the awareness of inconsistencies or discrepancy becomes a significant motivator for change, as people are

motivated to escape psychological discomfort (Elliot & Devine, 1994). Indeed, the principles of cognitive dissonance largely overlap with MI techniques, which consist of highlighting instances of cognitive dissonance and guiding the client toward positive behavioural change (Draycott & Dabbs, 1998; Miller & Rollnick, 2002). Thus, gamblers who view the self to be discontinuous may be motivated to escape current feelings of distress. I argue that this desire to escape psychological discomfort may manifest into making an attempt to change one's harmful gambling behaviours.

In support of these contentions, Kim and Wohl (2015) found that self-discontinuity was associated with readiness to change among problem gamblers. Furthermore, readiness to change was heightened to the degree that gamblers placed their past, non-addicted self in a more favourable light than their current, addicted self. This longing for the past self was found to be a critical motivator in the process of readying oneself for change, implying that nostalgia may be the underlying mechanism that moves gamblers toward change.

Nostalgia: The Motivating Mechanism

Nostalgia, a sentimental longing for the past, is a common human experience – over 80% of people report engaging in nostalgic reflection weekly (Wildschut, Sedikides, Arndt, & Routledge, 2006). Though the functional benefits of nostalgia have only recently garnered empirical attention, they are quickly gaining momentum. To date, these benefits include increased feelings of social connectedness, heightened self-esteem, positive affect (Wildschut et al., 2006; Vess, Arndt, Routledge, Sedikides, & Wildschut, 2012), a sense of meaning in life (Routledge et al., 2011), optimism for the future

(Cheung et al., 2013), and charitable giving (Zhou, Wildschut, Sedikides, Shi, & Feng, 2012).

In addition to these favourable functions, nostalgia also holds functional benefits among individuals who feel self-discontinuous (Iyer & Jetten, 2011). For example, Sedikides, Wildschut, Routledge, and Arndt (2015) determined that people who experienced negative life events (e.g., divorce) tended to feel nostalgic for their life before the negative event occurred. Indeed, participants asked to reflect on scenarios that elicited a negative sense of discontinuity (i.e., academic decline) reported significantly more nostalgia than both those asked to reflect on scenarios that elicited a positive sense of discontinuity (i.e., academic growth) or continuity (i.e., academic stability). Thus, among those who feel self-discontinuous, nostalgia stems from the perception that the current self is worse off than the past self (Sedikides et al., 2015). Interestingly, when participants engaged in nostalgic reflection on the past before the discontinuity took hold, they felt closer to their past self, which promoted a regained sense of self-continuity. That is, feelings of nostalgia restored participants' feelings of self-continuity, counteracting the originally distressing states of self-discontinuity.

Among disordered gamblers, nostalgia resulting from feelings of self-discontinuity may serve a motivating function rather than a restorative function. That is, disordered gamblers who feel self-discontinuous may feel motivated to recapture the pre-addicted self in order to restore a sense of self-continuity. This motivation should ultimately manifest in behavioural change. Providing support for this claim, Kim and Wohl's (2015) manipulated problem drinkers' and disordered gamblers' feelings of self-discontinuity (and continuity) resulting from their addiction. Participants (regardless of

addiction) in the self-discontinuity condition reported heightened levels of nostalgic revere for the pre-addicted self than those in the self-continuity condition. Importantly, feeling nostalgic, in turn, increased self-reported readiness to change. Importantly, however, whether gamblers and drinkers engaged in an *actual* attempt to change their behavioural was not assessed. I addressed this empirical gap in the current research.

Past research has demonstrated that intention to change behaviours typically leads to behavioural change (see Webb & Sheeran, 2006). Indeed, forward transitions through the TTM of behavioural change indicate that as one becomes ready to change, the stronger their intentions to change (DiClemente et al., 1991). However, despite the apparent motivation to change, not everyone will take action to change (Webb & Sheeran, 2006; Prochaska et al., 1992). For example, people's mindset towards human behaviour may influence whether or not they attempt behavioural change. Indeed, implicit mindsets about human behaviour may dictate the types of goals people set in addition to how they are met (Dweck, 1996). In the present research, gambler's implicit theories toward human behaviour are assessed as a potential moderator of the motivational effects of self-discontinuity and nostalgia on behavioural change.

Implicit Theories as a Moderator of Change

Intention to make a behavioural change is the most common predictor of engaging in behavioural change (Webb & Sheeran, 2006). Indeed, Ledgerwood and colleagues (2013) determined that gamblers in the later stages of TTM of behavioural change (e.g., preparation) were more likely to initiate action than were gamblers in the earlier stages of change (e.g., contemplation). However, it is common for gamblers who indicate being ready for change to back-pedal through the stages of change (e.g., regressing from

preparation back to contemplation). For example, the extant literature outlines a number of barriers that hinder behavioural change among disordered gamblers, among which include shame, guilt, and self-stigma (Suurvali, Cordingley, Hodgins, & Cunningham, 2009). Therefore, not everyone who feels nostalgic for their life before gambling will make an attempt to change their behaviour.

According to Dweck (1996), people differ in the extent to which they believe human behaviour is malleable. Incremental theorists endorse the belief that human behaviour is malleable and can change with effort, whereas entity theorists endorse the belief that human behaviour remains relatively stable, regardless of what action is taken. Interestingly, these globalized beliefs about behavioural change appear to dictate how people approach goals. For example, Henderson and Dweck (1990) demonstrated that in the face of challenging situations, such as threat of academic failure among students, incremental theorists showed gains in academic achievement due to their hard work and persistence as opposed to entity theorists, who were more likely to show academic decline due to their preoccupation with the evaluation of their performance. Indeed, incremental theorists tend to set learning goals for themselves and treat failure as a challenge by responding with increased effort at the task at hand. Entity theorists, however, set performance goals and treat failure as a testament to their ability (Dweck & Leggett, 1988; Dweck, 1996). Furthermore, entity theorists who believe their resources for change are fixed are more likely to give up on goals that seem difficult to obtain (Mukhopadhyay & Johar, 2005).

Despite the paucity of empirical attention placed on implicit theories among people engaging in addictive behaviours, implicit theories may influence whether or not

gamblers' follow through with behavioural change. From a goal-oriented perspective, incremental theorists are more likely to persist in the face of challenges, and thus may be more successful at setting and obtaining difficult goals (Dweck & Leggett, 1988; Dweck, 1996). Taking action (e.g., cutting down) is a challenging goal to set for oneself (Polivy & Herman, 2002; Prochaska et al., 1992), and thus gamblers who endorse incremental views of behavioural change may be more likely to attempt such a goal. Gamblers who endorse an entity view of behavioural change, however, may instead view taking action as an opportunity for failure, and avoid such negative feedback. Regardless of whether behavioural change is a goal one sets for oneself, disordered gamblers who believe that their gambling behaviour has the capacity to change may be more likely to attempt change over time.

However, it is important to note that in order for implicit theories to influence gamblers' attempts to change their behaviours, one must possess the initial motivation. Indeed, people are more likely to set goals for themselves if they believe that goal is important to them and can be attained (Locke, 1996). According to Brehm and Self (1989), the intensity of motivation is a function of potential motivation and motivational arousal. When little effort is needed, motivational arousal will be low. On the other hand, the greater the potential motivation, the greater is the amount of energy that a person will be willing to exert. However, there lies an upper limit at which point motivation becomes non-existent, as the perceived effort is greater than the motivation itself.

In line with Brehm and Self's (1989) review, gamblers who are motivated to recapture the past, non-addicted self by attempting behavioural change will be more likely to do so if they view behavioural change as a viable outcome. Incremental

theorists, who tend to set more challenging goals, may be willing to exert more effort to initiate behavioural change when they are motivated to do so (via feelings of nostalgia). However, if incremental theorists are not motivated to initiate change (i.e., do not feel nostalgic for their past), they will be least likely to engage in behavioural change, as they are missing a key component (i.e., potential motivation) to action. Entity theorists, however, may not view behavioural change as an outcome within their control. It can be argued that if entity theorists do not believe that human behaviour is capable of change, any effort they exert would be futile, and motivation would have no influence on whether behavioural change is sought. Thus, it is expected that nostalgic longing for the past will only have an effect on behavioural change among disordered gamblers who hold an incremental mindset of human behaviour.

Present Research

Using a longitudinal design, the present study examined the predictive utility of self-discontinuity and nostalgia for making an attempt at behavioural change among a sample of disordered gamblers. I hypothesized that feelings of self-discontinuity arising from one's disordered gambling behaviours will lead to a greater likelihood of attempting behavioural change over a three-month period. Moreover, I expected that this relationship will be heightened to the extent that gamblers long for the pre-addicted self. Indeed, Kim and Wohl (2015) determined that self-discontinuity leads to readiness to change (via nostalgia) for people engaging in addictive behaviours. Thus, Phase I (i.e., the initial session) provided the opportunity to replicate these findings among this sample of disordered gamblers by assessing readiness to change as a preliminary outcome variable. However, as there is often a disjoint between intention to change and taking action to

change (Prochaska et al., 1992; Webb & Sheeran, 2006), I extended Kim and Wohl's (2015) model by examining this relationship over time to predict attempts at behavioural change.

Importantly, the present research also tested who is most likely to attempt behavioural change when self-discontinuity-induced nostalgia is high. I hypothesized that disordered gamblers may recognize that their gambling is in need of change, but may not act on this if they believe that behaviour is fixed. Thus, I expected that disordered gamblers who feel discontinuous and, in turn, nostalgic for their pre-addicted self will be more likely to engage in change only if they hold the belief that human behaviour is malleable. On the contrary, this indirect relationship was expected not to hold for those who believe human behaviour is fixed. I tested the hypothesized moderated-mediation model of behavioural change among a sample of disordered gamblers in the community over a three-month period.

Methods

Participants

Potential participants were recruited from Amazon.com's Mechanical Turk (MTurk) system. MTurk allows "workers" to complete small tasks for monetary compensation. Buhrmester, Kwang, and Gosling (2011) found that the majority of "workers" participate out of interest or to pass the time, rather than for the sake of compensation, making these participants a good source of data. Importantly, MTurk is a reliable and valid means to recruit gamblers, drinkers, and cannabis users (Kim & Hodgins, 2016).

Participation on MTurk was limited to people who were currently engaging in gambling activities (e.g., slot machines, poker, roulette, sports betting), or have done so in the past 12 months. Moreover, participation was also limited to participants who reported at least one symptom of problem gambling using an adapted version of the NODS-CLiP (Toce-Gerstein, Gerstein, & Volberg, 2009). The purpose of screening participants was to ensure that enough disordered gamblers (i.e., the target sample) were present in the study. The NODS-CLiP is a standardized diagnostic interview instrument to assess disordered gambling, and has been shown to have good reliability with other measures of problem gambling symptomology (e.g., Problem Gambling Severity Index; Ferris & Wynne, 2001; Toce-Gerstein et al., 2009). The NODS-CLiP consists of three items. These items were: “Have there ever been periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences, or planning out future gambling ventures or bets?”, “Have you ever tried to stop, cut down, or control your gambling?”, and “Have you ever lied to family members, friends, or others about how much you gamble or how much money you lost on gambling?” A fourth item (“Has there ever been a period when, if you lost money gambling one day, you would often return another day to get even?”) was included to assess the extent to which participants chase their losses – a central characteristic of disordered gambling (APA, 2013). Based this inclusion criteria, I recruited 392 American gamblers (198 male, 189 female, 5 unreported), who ranged in age from 18 to 72 years ($M = 35.78$, $SD = 11.80$).

Because the focus of this study was attempted behavioural change among disordered gamblers, the sample used for analysis was further limited to only participants who exhibited moderate to disordered problem gambling symptomology and who were

not currently taking action to change their gambling behaviours. From the original sample of 392 participants, 260 moderate and disordered gamblers (125 male, 135 female) were identified using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). Furthermore, seven participants who were currently taking action to change their gambling behaviour were identified using the readiness to change ladder (Biener & Abrams, 1991), and thus were excluded from the subsequent analyses. Eight participants also indicated that they were currently seeking professional treatment for their gambling problems, and were also excluded from analyses. Lastly, two participants did not complete the measures of interest, and were excluded from analyses due to missing data. Thus, the final sample for the initial session (Phase I) consisted of 243 moderate and disordered gamblers (117 male, 126 female). Participants' ages ranged from 18 to 71 years ($M = 35.09$, $SD = 11.38$).

At recruitment, permission was sought to re-contact participants for a brief follow-up session three-months following the initial session. They were informed that they would earn US \$0.25 for completing the initial survey (approximately 15 minutes in duration) and an additional US \$0.75 (with a \$1.00 bonus) for completing the three-month follow-up session. The compensation rates are based on what is typically offered on MTurk for similar psychological studies with duration between 10 and 15 minutes (Buhrmester et al., 2011). Furthermore, the inclusion of a bonus for the follow-up session was intended to entice participants to complete this session in order to reduce the attrition rate, as attrition is typically higher among gamblers on MTurk (Kim, Wohl, Salmon, Gupta, & Derevensky, 2015; Wohl & Sztainert, 2012).

Three months later, 192 participants who provided consent to be re-contacted to take part in the follow-up session were re-contact via email. Of these 192 participants, 120 (49.38% of original sample) consented to participate in the follow-up session. Thus, the final sample for the longitudinal analyses consisted of 120 moderate and problem gamblers (55 male, 65 female) who were not seeking professional treatment or taking action to change their gambling behaviour at Phase I. Participants' age ranged from 20 to 66 years ($M = 35.18$, $SD = 10.66$).

Procedure

A recruitment notice (see Appendix A) was posted on MTurk advertising the nature of the study. Upon agreeing to participate in the present study, the MTurk recruitment notice linked participants to the online study hosted by Qualtrics. Participants were then provided with the informed consent form (see Appendix B), explaining the nature of the longitudinal nature of the study. All consenting participants were subject to eligibility criteria (see Appendix C). Participants who failed the eligibility criteria were re-directed to an ineligibility script (see Appendix F) and were unable to continue with the survey. Eligible participants continued with the survey and completed a series of questionnaires measuring the variables of interest (see Appendix D for questionnaire package). Specifically, participants were assessed on problem gambling symptomology, self-discontinuity, nostalgia, implicit theories, readiness to change, and demographics. Upon completion of the questionnaires, participants were provided with an informed consent for re-contact, which allowed participants to voluntarily provide their information (i.e., name, email address or phone number, and Worker ID; see Appendix E) to be re-contacted for the three-month follow-up session. Once participants indicated

whether or not they would like to participate in the subsequent follow-up sessions, they were redirected to a debriefing page (Appendix G).

To reduce attrition, a reminder email was sent to all participants (who gave permission to be re-contacted) one month prior to the follow-up to remind them of the upcoming follow-up session (Appendix L). Three months from the initial session, participants who indicated during Phase I that they would like to participate in the follow-up session were re-contacted with the link to the survey hosted by Qualtrics. Participants were provided with the informed consent form (see Appendix H), explaining the nature of the follow-up session. All consenting participants continued on with the survey and completed a brief series of items assessing whether or not they had made an attempt to change their gambling behaviour in the past three months (i.e., since the initial session; see Appendix I). These items were expected to take approximately ten minutes to complete. Upon completion of the questionnaire, participants were prompted to provide their Worker ID to link their data between sessions (Appendix J). Participants were reassured that the purpose of providing their Worker ID was solely to link their data and provide participants with compensation through MTurk, and that any personal or identifying information was kept in strict confidentiality. Once the study was complete, participants' Worker IDs were deleted as to maintain participant anonymity. Lastly, participants were directed to the full debriefing page (Appendix K) where the full nature of the study was disclosed.

This research was reviewed and cleared by the Carleton University Psychology Research Ethics Board.

Measures

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 ($\alpha = .87$).

Readiness to Change. Readiness to change gambling behaviours was assessed using a single item adaptation of Biener and Abrams (1991) contemplation ladder. The contemplation ladder was originally developed to assess readiness to quit smoking, and has been shown to be a strong measure of smokers’ readiness to change (Biener & Abrams, 1991). The contemplation ladder is continuous and is anchored at 0 (*no thought of changing*) and 10 (*taking action to change – e.g., cutting down, enrolling in a program*).

Self-Discontinuity. Self-discontinuity was assessed with a four-item measure adapted from an Iyer and Jetten (2011) Identity Continuity measure. Sample items consist of, “The person I was before I started gambling is different from the person I am now,” “Gambling has changed who I am,” “When I think about who I am now, it is different from who I was before I started gambling,” and a reverse-coded item, “There is no

difference between who I am now and who I was before I started gambling.” Each item was anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Participants’ scores were calculated by obtaining the mean of the four items ($\alpha = .91$).

Nostalgia. Nostalgic reverie for the pre-addicted self was assessed using a five-item measure adapted from Iyer and Jetten (2011). Sample items consist of, “I am already feeling quite nostalgic about my life before gambling,” “Now that I have started gambling, I miss my previous lifestyle,” “Before I started gambling, I was a better person than I am today,” “I like the person I was before I started gambling better than the person that I am now,” and a reverse-coded item, “I do not long for my life before gambling.” Each item was anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Participants’ scores were calculated by obtaining the mean of the five items ($\alpha = .83$).

Implicit Theories. Implicit theories regarding behavioural change were assessed using a three-item measure adapted from Hong, Chiu, Dweck, Lin, and Wan (1999). Sample items consist of, “People have a predisposition to develop certain gambling habits and they really can’t do much to change it,” “People’s gambling behaviour is something about them that they can’t change very much,” and “People can try new things, but they can’t really change their gambling habits.” Each item was anchored at 1 (*strongly disagree*) and 6 (*strongly agree*), with higher scores indicating a higher tendency to endorse the belief that behaviour is fixed. Participants’ scores were calculated by obtaining the mean of the three items ($\alpha = .82$).

Attempted Change. Attempted behavioural change was assessed with a single item measure created in the lab, “Have you made an attempt to quit or cut down on your gambling in the last 3 months?” Responses to this item were dichotomous (*yes* or *no*).

Follow-up items were also included according to the participant's response. For example, if participants responded "no" to taking action to change, responses were prompted with open-ended items such as, "Why do you think you have not cut down on your gambling?" If participants responded "yes" to taking action to change, responses were prompted with open-ended items such as, "Why do you think you were able to cut down on your gambling?" In addition, participants who attempted change were also asked about the avenue by which the attempt was made (i.e., professional treatment or self-help). These items were included with the intention of gaining further insight into the process of behavioural change.

Results

Preliminary Analyses

To ensure proper assumptions were met for the regression analysis, the data were screened for normality, outliers, and multicollinearity. Minimum and maximum values on the variables of interest were also calculated to ensure all scores fell within their proper range.

There were no observed differences between those who did and those who did not complete the follow-up session on any of the measured variables. Specifically, there were no differences in problem gambling severity, $F(1, 241) = .11, p = .74, \eta^2 < .001$, self-discontinuity, $F(1, 241) = 1.22, p = .27, \eta^2 = .005$, nostalgia, $F(1, 240) = 1.45, p = .23, \eta^2 = .006$, implicit theories, $F(1, 241) = .48, p = .49, \eta^2 = .002$, or readiness to change, $F(1, 241) = .08, p = .78, \eta^2 < .001$.

Normality. To test for univariate normality among the scale variables of interest, a statistical test of normality (Shapiro-Wilk) was calculated for discontinuity, nostalgia,

implicit theories, and readiness to change. Results indicated that the assumption of normality was violated for discontinuity $W(242) = .96, p < .001$, nostalgia $W(242) = .98, p = .001$, implicit theories $W(242) = .97, p < .001$, and readiness to change, $W(242) = .90, p < .001$. Additional tests were conducted for skewness and kurtosis to determine whether transformations were necessary for each independent variable. Z-tests revealed that there was no significant skewness or kurtosis for discontinuity ($z_{skewness} = .07, z_{kurtosis} = -3.13$), nostalgia ($z_{skewness} = 2.44, z_{kurtosis} = -.92$), and implicit theories ($z_{skewness} = 1.37, z_{kurtosis} = -1.90$). However, z-tests revealed that $z_{kurtosis}$ for readiness to change ($z_{skewness} = -.04, z_{kurtosis} = -4.67$) exceeded the critical value of $z_{kurtosis} = 3.29$ and violated the assumptions of normality. Thus, the main analyses will use a robust estimation method to account for non-normality within the data. For the purpose of interpretation, original scores were maintained.

Multivariate Outliers. To examine for possible cases of multivariate outliers, a multiple linear regression was performed with readiness to change as the dependent variable and discontinuity, nostalgia, and implicit theories as predictors. Mahalanobis Distance statistics were then saved for examination. Mahalanobis Distance (*MD*) is a measure of the distance between an observed data point on all three predictor variables and the observed distribution of data points for the combination of variables. The higher the value of *MD*, the greater the distance between the observed data point and the distribution and thus, the more extreme the outlier on all three variables. Significance values of *MD* were also calculated, representing whether the distance observed for one data point is significantly different from the distribution of data points (Haslett & Hayes, 1998; Mahalanobis, 1936). Using this approach, one multivariate outlier was identified

($MD = 18.92, p = .0003$). To determine impact, the main analyses were run with and without the multivariate outlier. The removal of the outlier had little to no impact: the direction of the effect did not change and significance values did not change. Thus, to retain the maximum number of cases possible, the outlier was not retained for the main analyses.

Multicollinearity. Multicollinearity was not a concern as the largest correlation coefficient observed between predictor variables was between self-discontinuity and nostalgia, which was less than the cut-off value of $r = .80, r(243) = .69, p < .001$ (Cohen, Cohen, West, & Aiken, 2003). See Table 1 for correlation coefficients between each of the variables of interest.

Main Analyses

Table 1 contains the means, standard deviations, and correlation coefficients between each variable of interest. Due to evidence of non-normality, Mplus software was used to analyze the data as it offers robust regression analyses. The robust weighted least squares estimation method was used to minimize the impact of non-normality on the estimation of the standard errors for all direct effects. For the indirect effects, statistical significance was assessed using bootstrapped 95% bias-corrected confidence intervals with 5000 iterations. Bootstrapping is a nonparametric approach that does not assume normality within the data (Preacher & Hayes, 2004), allowing for confidence in the interpretation of the results.

Readiness to Change. I first tested the hypothesized mediation model in which self-discontinuity (the predictor variable) predicted gamblers' readiness to change (the outcome variable) via nostalgia (the mediating variable). To do so, I used the robust

weighted least squares estimation method in Mplus Version 7. I also used bootstrapping with 5000 iterations to obtain bias-corrected 95% confidence intervals (CIs) for the indirect effect. The index of mediation was significant ($p < .05$), $index = .16$, $SE = .06$, 95% CI [.06, .26], providing support for the mediation model by which nostalgia mediates the relationship between self-discontinuity and readiness to change (see Figure 1 for direct and indirect effects).

Attempted Behavioural Change. I then proceeded to test the central hypothesis, in which self-discontinuity (the predictor variable) increases the odds of attempting change (the outcome variable; attempt = 1, no attempt = 0) via nostalgia (the mediating variable; mean-centered), but only among those who endorse incremental theories of behaviour (the moderating variable; mean-centered). Again, I used the robust weighted least squares estimation method to test the moderated-mediation model in Mplus Version 7. Bootstrapping with 5000 iterations was used to obtain bias-corrected 95% CIs for the indirect effects. The index of moderated-mediation was significant ($p < .05$), $index = -.11$, $SE = .05$, 95% CI [-.24, -.001]. Self-discontinuity was significantly associated with an increased likelihood of attempting change via nostalgia among gamblers who endorsed incremental theories, $b = .25$, $SE = .09$, 95% CI [.06, .45], but not among those who endorsed entity theories, $b = .02$, $SE = .09$, 95% CI [-.18, .20]. The results were consistent with the hypothesized moderated-mediation model (see Figure 2 for direct and indirect effects).

Discussion

The results of the current study demonstrated that a sense of self-discontinuity may be beneficial among people engaging in an addictive behaviour. At Phase I, I

replicated Kim and Wohl's (2015) findings that a sense of self-discontinuity facilitates readiness to change among disordered gamblers. As expected, the process by which this occurred was through nostalgia for one's past self (i.e., the self that existed prior to engaging in disordered gambling behaviours). The opportunity to replicate these findings was important in ensuring that these results were not due to chance, and provided the basis for the longitudinal nature of the current study that sought to expand on Kim and Wohl's (2015) findings.

As there is often a disjoint between readiness to change and making an attempt to change addictive behaviours (Prochaska et al., 1992), the current study sought to determine whether self-discontinuity would also facilitate an attempt at behavioural change over time. I hypothesized that feelings of self-discontinuity would facilitate a change attempt among disordered gamblers through nostalgia for the pre-addicted self. Moreover, I hypothesized that this relationship would not hold for all disordered gamblers. Rather, disordered gamblers who endorse incremental theories of behaviour (i.e., behaviour is malleable) should be more likely to attempt change when feeling self-discontinuous, and thus nostalgic, than those who endorse entity theories of behaviour (i.e., behaviour is fixed). Results of the current study supported this hypothesis, demonstrating that self-discontinuity increased the likelihood of attempting behavioural change (via nostalgia) among gamblers who believed that behaviour is malleable, as opposed to fixed.

The results of the current study also support past research by Sedikides and colleagues (2015) who showed that feelings of negative self-discontinuity (i.e., that the current self is worse off than the past self) heightened nostalgic reverie for the past self.

Importantly, reflecting nostalgically on the past helps people regain a sense of self-continuity. Addictive behaviours, such as disordered gambling, tend to be a pervasive force in one's life, often resulting in negative changes to one's sense of self (Hardoon, Gupta, & Derevensky, 2004; Volberg, Reitzes, & Boles, 1997). These changes often give rise to feelings of self-discontinuity, where the disordered gambler feels that the current, addicted self is worse off than the past, non-addicted self (Kim & Wohl, 2015). In this light, disordered gamblers cannot regain a sense of self-continuity whilst continuing to gamble excessively (due to the negative consequences associated with disordered patterns of play). Instead, to regain a sense of continuity, the disordered gambler must change their behaviour. Reflecting nostalgically on the past, non-addicted self appears to be the mechanism that motivated gamblers to move toward continuity by way of attempting to change their behaviours.

Importantly, results from the current research also showed that self-discontinuity facilitated change attempts via nostalgia among incremental theorists (i.e., those who believe that people are generally capable of change), but not entity theorists (i.e., those who believed that behaviour is relatively stable over time). These findings are in line with Brehm and Self's (1989) theory of motivational intensity. When behavioural change is perceived to be easy or possible, people are more likely to change their behaviour when they are motivated to do so. However, when behavioural change is perceived to be difficult or impossible, motivation will not influence whether action is taken to change behaviours. Translated to the current findings, gamblers attempted change via self-discontinuity induced nostalgia only when they perceived that change is possible. When they perceived that change is not possible (i.e., because it is too hard), a sense self-

discontinuity had no impact on attempted change (via nostalgia). This suggests that people's implicit theories of human nature play a key role in the motivational intensity needed to engage in behavioural change.

Implications and Future Directions

The findings of this research have a number of basic and applied implications. From a basic perspective, these findings contribute to the limited literature on factors that move people through the stages of change toward action. Much of the existing empirical research examines *how* people change (DiClemente et al., 1991; Velicer et al., 1985), though relatively few studies are able to identify *why* people change (Evans & Delfabbro, 2005). The current study demonstrated both the processes of change, in addition to for whom change is more likely to occur. Moreover, the social psychology literature on the functional benefits of nostalgia has only speculated as to the behavioural implications of engaging in nostalgic reverie. Herein, I found that discontinuity and nostalgia hold motivational properties for people engaging in disordered gambling behaviours by motivating an attempt to quit or cut down on such problematic behaviours.

From an applied perspective, these findings suggest that orienting disordered gamblers to think back to a positive past self is beneficial for motivating behavioural change. The Motivational Interviewing (MI) framework incorporates "looking back" as part of the process of change, however a much greater deal of emphasis is placed on "looking ahead" (Miller & Rollnick, 2002). Therefore, it may behoove health care providers to highlight to clients a) how gambling has fundamentally changed who they are, and b) what positive elements of their past they are aiming to recapture. Moreover, it would be essential to also promote the notion that human behaviour is malleable when

motivating their clients to engage in behavioural change. In sum, the results of this research further support the notion that self-discontinuity holds motivational properties within the addiction framework.

Future research would do well to manipulate the variables of interest to assess behavioural outcomes over time. Self-discontinuity manipulations have been successful in both healthy populations (Iyer & Jetten, 2011) and addicted populations (Kim & Wohl, 2015), and would allow for a more causal interpretation of why some gamblers attempt behavioural change. Moreover, implicit theories can be temporarily altered through manipulations (see Hong et al., 1999). Manipulating gamblers to believe that behaviour is malleable as opposed to stable can expand on these findings by offering more insight into the facilitators and barriers to change. Should such manipulations be successful, they can be incorporated into clinical practice as brief interventions to motivate behavioural change among clients.

Future investigations would also benefit from examining the utility of self-discontinuity induced nostalgia in a clinical setting. Clinical populations tend to have key differences that separate them from their community counterparts. Specifically, clients in treatment typically have higher problem gambling severity than gamblers in the community (Cunningham-Williams, Cottler, Compton, Spitznagel, & Ben-Abdallah, 2000). Indeed, many gamblers end up in treatment due to psychological, physical, or financial crisis, often viewing treatment as a last resort to behavioural change (Evans & Delfabbro, 2005). Although I restricted the sample to moderate and disordered gamblers (who are most in need of change), there may be key differences in how gamblers in treatment engage in nostalgic reflection compared to gamblers in the community.

Moreover, a past orientation can be weighed against the traditional future orientation that is emphasized in the MI framework (Miller & Rollnick, 2002). The future can often be anxiety-inducing, due to the unknown nature of what life might look like without the addiction. However, a nostalgic view of the past may offer concrete examples of what life looked like without the addiction and promote a clear vision of what can be recaptured via behavioural change.

Limitations

There are a couple of limitations of the current study worth noting. First, the study relied on self report data. Self report data have the potential to introduce bias to participants' responses, in part because people are motivated to present a favourable image of themselves (i.e., social desirability; Van de Mortel, 2008). With that said, past research by Kim and Wohl (2015) has manipulated self-discontinuity among disordered gamblers, which resulted in increased levels of readiness to change among gamblers made to feel self-discontinuous. This offers some degree of confidence in these findings, demonstrating that self-discontinuity is directly (and indirectly) associated with readiness to engage in behavioural change. Furthermore, the findings of the current study showed that self-discontinuity was associated with higher readiness to change at Phase I as well as an increased likelihood of attempting change at Phase II. Though this study relied on self report data, the finding that self reported levels of self-discontinuity facilitated a change attempt three months later among disordered gamblers is promising.

Second, the attrition rate was relatively high. Only 49.38% of the original sample completing the three-month follow-up. Unfortunately, attrition tends to be high for longitudinal studies on MTurk (the platform I used to recruit participants; Daly &

Natarajan, 2015), and is particularly higher among MTurk workers who gamble and participate in gambling-oriented research (see Kim et al., 2015; Wohl & Sztainert, 2011). Knowing this, I took steps to reduce attrition where possible by offering increased remuneration for participating in the follow-up study with the addition of a bonus reward. Moreover, I recruited a larger sample of disordered gamblers at Phase I to maintain sufficient power for the longitudinal analysis, which counteracted the negative effects of attrition.

Lastly, the current research did not follow participants beyond the follow-up session. As such, it is not known whether gamblers' change attempts were sustained. That is, the results demonstrate that self-discontinuity and nostalgia are associated with higher likelihood of *attempting* change three months later for those who hold incremental theories of behaviour. As previously noted, however, change is not a linear process. People typically cycle in and out of action before behavioural change is sustained (Prochaska et al., 1992). Therefore, it is likely that gamblers who attempted to quit or cut down on their gambling were not able to sustain this change in behaviour over time. With that said, it is worth noting that moving people toward action is exceptionally difficult – people generally do not want to change. In fact, only 7 to 12% of disordered gamblers take the needed measures to engage in behavioural change (Slutske, 2006). Thus, the fact that the procedure used in the current research promoted change attempts among some participants is not only encouraging, it is striking.

Conclusion

Self-discontinuity is traditionally perceived to be a distressing state of being as it disconnects people from who they once were (Iyer & Jetten, 2011; Lampinen et al., 2004;

Sedikides, Wildschut, Gaertner, Routledge, & Arndt, 2008). However, feeling self-discontinuous has been shown to hold motivational properties for people engaging in disordered gambling behaviours. That is, self-discontinuity facilitates attempts at behavioural change over time due to feelings of nostalgia for the positive past, non-addicted self. Couched within Kim and Wohl's (2015) findings, nostalgia is emerging as a powerful emotion with important behavioural outcomes for disordered gambling populations. Importantly, the motivation to change that arises from nostalgic reflection alone is not enough to motivate gamblers to make a change attempt. Gamblers must also hold the belief that human beings are capable of change before action can be taken.

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List of Tables

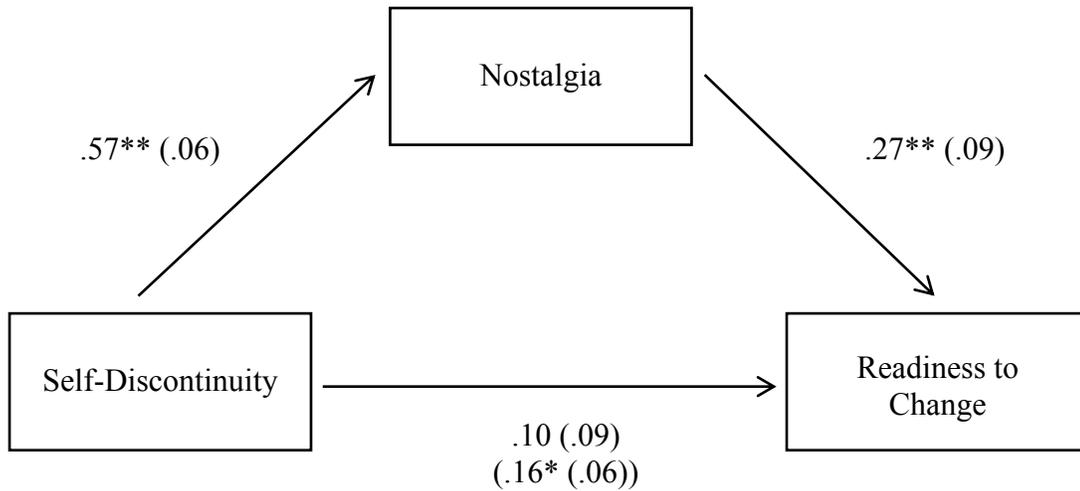
Table 1

Means, Standard Deviations, and Correlation Coefficients between each Variable of Interest

Variables	<i>M</i>	<i>SD</i>	Correlation Coefficients (<i>r</i>)				
			1.	2.	3.	4.	5.
1. Self-Discontinuity	3.64	1.55	-				
2. Nostalgia	3.31	1.30	.69**	-			
3. Implicit Theories ^a	2.87	1.05	.14*	.15*	-		
4. Readiness to Change	4.39	3.19	.33**	.41**	.05	-	
5. Attempted Change	.60	.49	.25**	.28**	.13	.35**	-

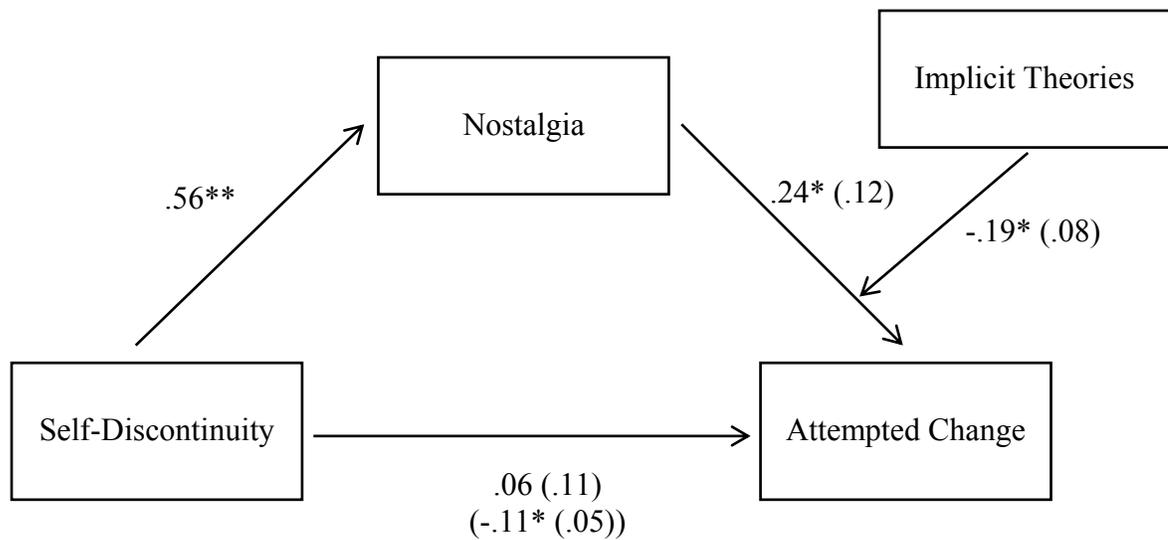
Note: ^a Higher scores = higher entity theories; ^b Yes = 1, No = 0; * $p < .05$; ** $p < .01$

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Note: * $p < .05$, ** $p < .001$

Figure 1. Mediation model demonstrating the indirect effect of nostalgia between self-discontinuity and readiness to change. The regression coefficient for the indirect effect of self-discontinuity on readiness to change, controlling for nostalgia, is in parentheses below the coefficient for the direct effect of self-discontinuity on readiness to change.



Note: $*p < .05$, $**p < .001$

Figure 2. Moderated-mediation model demonstrating the indirect effect of self-discontinuity on attempted behavioural change via nostalgia, conditional on gamblers' implicit theories of behaviour. The regression coefficient for the indirect effect of self-discontinuity on attempted change, controlling for nostalgia, is in parentheses below the coefficient for the direct effect of self-discontinuity on attempted change.

Appendix A: Notice for Recruitment

Announcement for MTurk

Perceptions of Responsible Gambling – Phase I (15mins/\$0.25)

Only people who gamble (e.g., buy lottery tickets, play slots machines or table games at a gambling venue, i.e., casino or online) are eligible for this study.

In this study you will be asked to answer a variety of questions about gambling. Specifically, you will be asked to answer a variety of questions about your gambling behavior (when and why you gamble), your self-perceptions (life satisfaction and beliefs about who you are today compared to your past) as well as your thoughts about changing your gambling behavior.

We will also ask for your permission to contact you for two brief follow-up sessions. Specifically, a follow-up session will be conducted 3 months later, at which point you will complete a shorter series of questionnaires. For the initial session, you will earn \$0.25 for 15 minutes of your time. For the 3-month follow-up session (approximately 10 minutes), you will receive an additional \$0.75 bonus reward. **For completing both sessions, you will receive a \$1.00 bonus (for a total of \$2.00).**

Your participation as well as your responses will be strictly confidential. Only researchers associated with the research project will know you participated in the study and no one will know how you responded to the questions asked. In addition, your responses will be anonymous and you will not be asked any identifying information. Know that information you provide that allows us to re-contact you will be kept separate from your responses. At the end of the study, we will destroy all contact information.

We can anticipate no physical discomfort to you as a result of your participation in this study. You may, however, experience anxiety or distress when thinking about past or current gambling activities. In the event you feel anxiety or distress, information will be provided linking you to appropriate health services in your local area.

Eligibility Requirements:

1. Resident of the United States of America.
2. Must currently participate in at least one form of gambling (e.g. poker, blackjack, roulette, slot machine, sports betting etc.).

This study takes about 15 minutes, and upon completion you will receive US \$0.25 for your participation.

This study has received clearance by the Carleton University Psychology Research Ethics Board (Reference #13-035).

Appendix B: Informed Consent

[Phase I]

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 Psychology Research Ethics Board (Reference #13-035).

Present study: Perceptions of Responsible Gambling (Phase I)

Research personnel: Melissa Salmon (Principal Investigator/ Graduate Student, Melissa_Salmon@carleton.ca)
Dr. Michael J. A. Wohl (Faculty Investigator, (613) 520-2600, ext. 2908; Michael_Wohl@carleton.ca)
Andrew (Hyouun) Kim (Other Research Personnel/Graduate Student, Hyouun_Kim@carleton.ca)
Carina Daugherty (Other Research Personnel/Research Assistant, Carina_Daugherty@carleton.ca)

Should you have any ethical concerns about this research, please contact Dr. Shelley Brown, Chair, Carleton University Psychology Research Ethics Board at Shelley.Brown@carleton.ca, (613) 520-2600 ext. 1505). For any other concerns, please contact, Dr. Joanna Pozzulo (Chair, Department of Psychology, 1 (613) 520-2600, ext. 1412, psychchair@carleton.ca).

Purpose and Task requirements: As a participant, you will be asked to answer a variety of questions about your gambling behavior (when and why you gamble) as well as your self-perceptions (i.e., beliefs about who you are today compared to your past).

Be assured that your name will not be associated in any way with the research findings. We are offering eligible participants who complete the study US \$0.25 for participating. You will receive an additional US \$0.75 for completing the 3 month follow-up session. **You will also receive a US \$1.00 bonus for completing both the initial session and the follow-up session, for a total of US \$2.00.** If at any point you choose to withdraw from this study, you will still be compensated for your participation

Duration and locale: The survey will be administered on-line and should take approximately 15 minutes to complete.

Potential risk/discomfort: We can anticipate no physical discomfort to you as a result of your participation in this study. You may, however, experience some stress when thinking about past or current gambling activities. If you do experience any distress or

discomfort, you may wish to contact one of the helplines nearest to your location. A list of helplines by town and state can be found at <http://www.ncpgambling.org/i4a/pages/index.cfm?pageid=1>. A copy of this information will be provided to you in the debriefing sheet following the questionnaires.

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 with no penalty whatsoever. To withdraw at any point, simply click “proceed” until you reach the debriefing page.

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.

We collect data 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.

By checking this box you agree to the following terms:

- I have read the above form and understand the conditions of my participation. My participation in this study is voluntary, and if for any reason, at any time, I wish to leave the experiment I may do so without having to give an explanation and with no penalty whatsoever. Furthermore, I am also aware that my participation as well as the data gathered in this study is confidential. Checking this box and clicking ‘Next’ indicates that I agree to participate in the study

- I do not consent to this study.

Appendix C: Eligibility Items**[Phase I]**

[Eligibility Item – If participant responds “no” to following item, then participant is ineligible.]

1. Over the last 12 months, have you spent more than \$100 on any kinds of gambling activities put together?
 - a. Yes
 - b. No

[Eligibility Items – If participant responds “yes” to one of the following four items, then participant is eligible. If participant responds “no” to ALL FOUR items, then participant is ineligible.]

1. Have there ever been periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling experiences, or planning out future gambling ventures or bets?
 - a. Yes
 - b. No
2. Have you ever tried to stop, cut down, or control your gambling?
 - a. Yes
 - b. No
3. Has there ever been a period when, if you lost money gambling one day, you would often return another day to get even?
 - a. Yes
 - b. No
4. Have you ever lied to family members, friends, or others about how much you gamble or how much money you lost on gambling?
 - a. Yes
 - b. No

Appendix D: Questionnaire Package**Self-Discontinuity****[Phase I]**

The following questionnaires are about how you perceive yourself and your self-concept.

Using the following scale, please indicate if you agree or disagree with the following statements. Please mark the answer of your choice to each question according to the following scale.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree

____ 1. Gambling has changed who I am.
____ 2. There is no difference between who I am now and who I was before I started gambling.*
____ 3. Please leave this item blank.
____ 4. The person I was before I started gambling is different from the person I am now.
____ 5. When I think about who I am now, it is different from who I was before I started gambling.

Nostalgia Inventory Scale

[Phase I]

Using the following scale, please indicate if you agree or disagree with the following statements. Please mark the answer of your choice to each question according to the following scale.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree or Disagree	Somewhat Agree	Agree	Strongly Agree

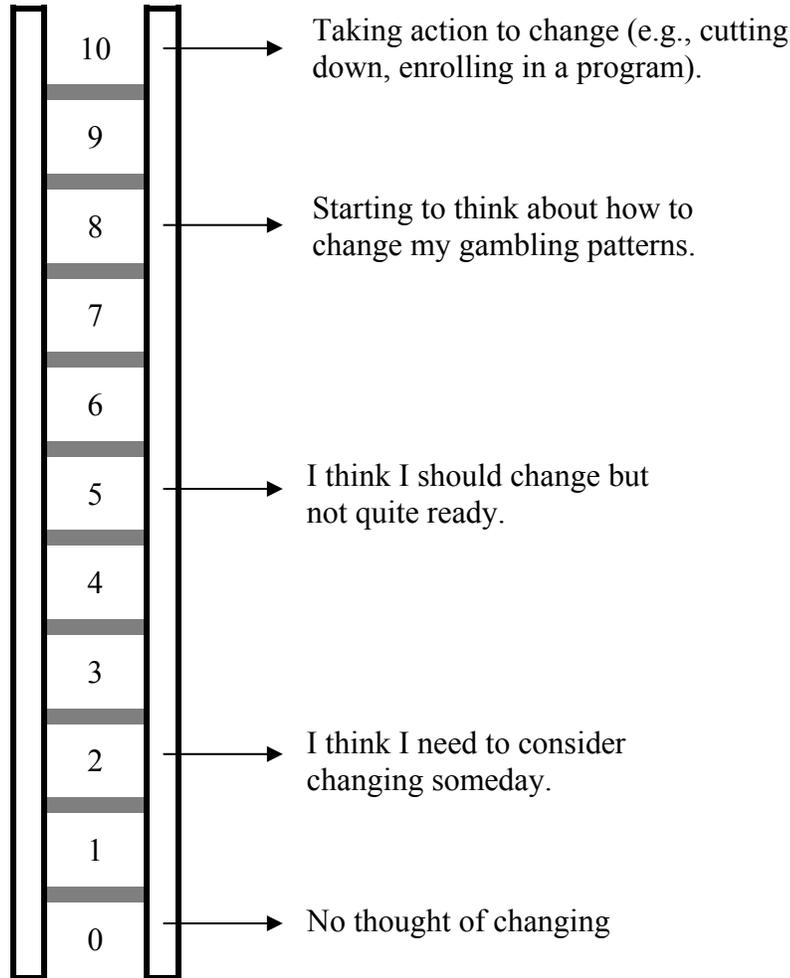
<input type="text"/> 1. I am already feeling quite nostalgic about my life before gambling.
<input type="text"/> 2. Now that I have started gambling, I miss my previous lifestyle.
<input type="text"/> 3. I do not long for my life before gambling.*
<input type="text"/> 4. Before I started gambling I was a better person than I am today.
<input type="text"/> 5. I like the person I was before I started gambling better than the person I am now.

Readiness to Change

[Phase I]

Each rung on this ladder represents where various gamblers are in their thinking about changing their gambling behaviors.

Select the number that indicates where you are now. Please select only one number.



2. Select a number that best describes your desire to change your gambling behaviors at this time:

No desire					Full desire				
0	1	2	3	4	5	6	7	8	9

Lay Theories**[Phase I]**

Please indicate the extent to which you agree or disagree with the following statements:

1	2	3	4	5	6
Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

1. People have a predisposition to develop certain gambling habits and they really can't do much to change it.
2. Please leave this item blank.
3. People's gambling behaviour is something about them that they can't change very much.
4. People can try new things, but they can't really change their gambling habits.

Problem Gambling Severity Index**[Phase I]**

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

Demographics and Gambling Activities**[Phase I]**

1. What is your age? _____
2. What is your gender?
 - a. Male
 - b. Female
3. Which category best describes your current employment situation?
 - c. Unemployed
 - d. Retired and not working for money
 - e. Homemaker and not working for money
 - f. Full-time student and not working for money
 - g. Sick leave, maternity leave, on strike, or disability
 - h. Employed part-time
 - i. Employed full-time
4. 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
5. I think I gamble a lot.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neither Agree nor Disagree
 - d. Agree
 - e. Strongly Agree
6. What type of gambling games do you prefer?
 - a. I prefer skill-based games (e.g., poker, blackjack)
 - b. I prefer chance-based games (e.g., slots, lottery)
7. Are you currently seeking professional treatment for gambling-related problems?
 - a. Yes
 - b. No

Appendix E: Consent for Re-Contact Form**[Phase I]**

The purpose of this informed consent is to ask for your permission to contact you again in 3 months for a brief follow-up survey.

Compensation: Participants will be given \$0.75 for participating in the 3 month follow-up. In addition, participants will receive a \$1.00 bonus for completing both sessions. **This results in a total of \$2.00 for completing our study.**

Anonymity/Confidentiality: The data collected in this experiment and in the context of any follow-up studies are confidential. All information you supply during the research will be held in confidence. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. The data are made available only to the researchers associated with this project. Your data will be labeled with a unique identification code. Any identifying information associated with your code will be confined to a single page that will be separated from your questionnaire, and kept in a separate, secured file by the research investigators, who will keep this information confidential and will only use it in the event of a follow-up study to connect your questionnaires. If you give us permission to contact you again, then your personal information will be kept for two years and then deleted.

Right to withdraw data: You have the right to withdraw this consent to be re-contacted at any time.

By completing the information below, I am indicating that I would like to be re-contacted in 3 months for the brief follow-up survey. If at the time of contact I do not wish to take part, I recognize that I'm free to decline at that time.

Name: _____

Email: _____

Phone Number: _____

Worker ID: _____

Appendix F: Ineligibility Debriefing**[Phase I]**

Thank you for your interest in this study, however at this time you are not eligible to participate.

If you have any questions or concerns, you may contact Melissa Salmon (melissa_salmon@carleton.ca), Michael Wohl (michael_wohl@carleton.ca), Andrew (Hyou) Kim (hyoun_kim@carleton.ca) or Carina Daugherty (carina_daugherty@carleton.ca).

Appendix G: Debriefing Form

[Phase I]

This study has received clearance by the Carleton University Psychology Research Ethics Board (Reference #13-035)

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

Compensation.

Please continue onto the next page to receive your completion code. Since the compensation for the study will be given directly by MTurk, we do not require any personal or identifying information.

What are we trying to learn in this research?

We are looking at possible associations between how people feel about themselves, their thoughts about gambling, and their gambling behavior.

Why is this important to scientists or the general public?

This research will contribute to our knowledge of how gambling behaviors relates to one's self-concept.

Phase II.

We may be contacting you in 3 months to participate in a brief 10-minute follow-up survey. For the 3 month follow-up survey, you will receive a bonus of \$0.75. Completing both the initial survey and the follow-up survey will result in a bonus of \$1.00, totaling \$2.00 for participating in this study. This follow-up is important to detect possible changes in people's thoughts and behaviors.

What if I have questions?

If you have any questions or comments about this research please feel free to contact one of the research personnel involved in this research:

Melissa Salmon: melissa_salmon@carleton.ca

Dr. Michael J. A. Wohl: michael.wohl@carleton.ca

Hyoun (Andrew) Kim: hyoun_kim@carleton.ca

Carina Daugherty: carina_daugherty@carleton.ca

If you have any ethical concerns about this research, please contact Dr. Shelley Brown, Chair, Carleton University Psychology Research Ethics Board at Shelley.Brown@carleton.ca, (613) 520-2600 ext. 1505). For any other concerns, please contact, Dr. Joanna Pozzulo (Chair, Department of Psychology, 1 (613) 520-2600, ext. 1412, psychchair@carleton.ca).

Is there anything I can do if I found this experiment to be emotionally upsetting?

Yes, if you feel any distress or anxiety after participating in this study there are a number of agencies that offer confidential services for Problem Gambling. A list of helplines by town and state can be found at

<http://www.ncpgambling.org/i4a/pages/index.cfm?pageid=1>.

Where can I get more resources on gambling research?

If you are interested in additional resources for gambling related resources, The National Center for Responsible Gaming <http://www.ncrg.org/> has a wealth of current research, information and confidential services for gambling and problem gambling research.

Additional resources can be found at <http://www.rgrc.org/en>

Thank you for participating in this study! We greatly appreciate your participation!

Appendix H: Informed Consent

[Phase II]

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 Psychology Research Ethics Board (Reference #13-035).

Present study: Perceptions of Responsible Gambling (Phase II).

Research personnel: Melissa Salmon (Principal Investigator/Graduate Student, Melissa_Salmon@carleton.ca)
Dr. Michael J. A. Wohl (Faculty Investigator, (613) 520-2600, ext. 2908; Michael_Wohl@carleton.ca)
Andrew (Hyoun) Kim (Other Research Personnel/Graduate Student, Hyoun_Kim@carleton.ca)
Carina Daugherty (Other Research Personnel/Research Assistant, Carina_Daugherty@carleton.ca)

Should you have any ethical concerns about this research, please contact Dr. Shelley Brown, Chair, Carleton University Psychology Research Ethics Board at Shelley.Brown@carleton.ca, (613) 520-2600 ext. 1505). For any other concerns, please contact, Dr. Joanna Pozzulo (Chair, Department of Psychology, 1 (613) 520-2600, ext. 1412, psychchair@carleton.ca).

Purpose and Task requirements: The aim of this study is to assess perceptions of self and gambling. As a participant, you will be asked to answer a variety of questions about your gambling behavior (when and why you gamble) as well as your self-perceptions (life satisfaction and beliefs about who you are today compared to your past).

Be assured that your name will not be associated in any way with the research findings. We are offering eligible participants who complete this 3 month follow-up study US \$0.75 for participating. If you completed the initial session, you will receive an additional US \$1.00 bonus for completing both sessions for a total of US \$2.00. If at any point you choose to withdraw from the study, you will still be compensated for your participation.

Duration and locale: The survey will be administered on-line and should take approximately 10 minutes to complete.

Potential risk/discomfort: We can anticipate no physical discomfort to you as a result of your participation in this study. You may, however, experience some stress when thinking about past or current gambling activities. If you do experience any distress or

discomfort, you may wish to contact one of the helplines nearest to your location. A list of helplines by town and state can be found at <http://www.ncpgambling.org/i4a/pages/index.cfm?pageid=1>. A copy of this information will be provided to you in the debriefing sheet following the questionnaires.

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 with no penalty whatsoever. To withdraw at any point, simply click “proceed” until you reach the debriefing page.

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.

We collect data 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.

By checking this box you agree to the following terms:

- I have read the above form and understand the conditions of my participation. My participation in this study is voluntary, and if for any reason, at any time, I wish to leave the experiment I may do so without having to give an explanation and with no penalty whatsoever. Furthermore, I am also aware that my participation as well as the data gathered in this study is confidential. Checking the box below and clicking ‘Next’ indicates that I agree to participate in the study

- I do not consent to this study.

Appendix I: Attempts at Behavioural Change**[Phase II]**

1. Have you made an attempt to quit or cut down on your gambling in the last 3 months?
 - a. Yes
 - b. No

2. If yes, to what extent have you quit or cut down on your gambling? (If no, please leave blank)
 - 1 – Not a lot
 - 2 – A little bit
 - 3 – Somewhat
 - 4 – Quite a bit
 - 5 – A lot

[If no to Q1]

3. Why do you think you have not cut down on your gambling?
-

[If yes to Q1]

4. Why do you think you were able to quit or cut down on gambling? How were you able to?
-

5. Please specify the avenue by which you attempt was made:

- a. Professional treatment
- b. Self-help

6. *[Display if Q5 is "a"]*: What is the **main** reason you sought professional treatment?

- a. I was pressured by my loved ones
- b. It was mandated by the legal system/bankruptcy trustee
- c. I was afraid my gambling problem would worsen
- d. Confident in professionals' abilities
- e. I did not feel I could do it on my own
- f. Failed attempts at self-help
- g. It was recommended to me by a friend, relative, significant other, etc.
- h. Other (If other, please specify: _____)

7. *[Display if Q5 is "b"]*: What is the **main** way you tried to help yourself?
- a. Self-help literature
 - b. Self-help groups such as Gamblers Anonymous
 - c. Self-exclusion
 - d. Setting limits on time spent or money spent on gambling
 - e. Finding an alternative to gambling (e.g., replacing gambling with exercise)
 - f. Talking to friends, family members, significant others, etc.
 - g. Attempting to quit on your own without outside help
 - h. Other (*If other, please specify:* _____)
8. *[Display if Q5 is "b"]*: Why did you choose self-help over professional treatment?
- a. Confident in my abilities (e.g., "I believed I could do it on my own")
 - b. Wanting to do it on my own
 - c. Lack of trust of mental health care professionals
 - d. Lack of professional services in my area
 - e. Shame/Guilt (e.g., "I am ashamed of my gambling behavior")
 - f. Other (*If other, please specify:* _____)

Appendix J: Request to Link up Data**[Phase II]**

To be able to grant your reward of \$0.75 for completing our 3 month follow-up session (in addition to your \$1.00 reward for completing both study sessions), please provide your Worker ID in the space below. This allows us to link up your responses to the previous session, and grant you your reward.

Please note that we will not be able to grant your reward for your participation if you do not provide your Worker ID.

Worker ID: _____

Appendix K: Debriefing Form

[Phase II]

This study has received clearance by the Carleton University Psychology Research Ethics Board (Reference #13-035)

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

Compensation.

Because we will be granting you a bonus reward, we have asked you to provide us with your Worker ID. Please note that this information will not be tied to your responses in any way.

What are we trying to learn in this research?

Past research has shown that gambling can develop into an addiction, causing harm to an individual's well-being. Despite the negative consequences associated with problem gambling, studies have shown that most gamblers are relatively unwilling to change their behaviors. Recently, research conducted in our lab has found that self-discontinuity (the perception that the self has experienced a fundamental change) was positively correlated with readiness to change. However, past studies could not assess whether actual change took place.

Thus, in this study, we were interested in whether self-discontinuity predicted actual behavior change over time. Specifically, we predicted that people who perceive a difference between who they were before gambling and who they are now will be more likely to engage in actual behavior change. Moreover, we assessed implicit theories as past studies have suggested that those who believe human behaviour is changeable may be more likely to attempt change. It was predicted that self-discontinuity would interact with implicit theories to result in an attempt at actual behavior change.

Why is this important to scientists or the general public?

Despite the harms associated with problematic gambling, willingness to change among gamblers is relatively low. Thus, this research attempts to delineate factors that may motivate gamblers to seek treatment and take action to change their behaviors.

What if I have questions? If you have any questions or comments about this research please feel free to contact one of the research personnel involved in this research:

Melissa Salmon: melissa_salmon@carleton.ca

Dr. Michael J. A. Wohl: michael.wohl@carleton.ca

Hyoun (Andrew) Kim: hyoun_kim@carleton.ca

Carina Daugherty: carina_daugherty@carleton.ca

If you have any ethical concerns about this research, please contact Dr. Shelley Brown, Chair, Carleton University Psychology Research Ethics Board at

Shelley.Brown@carleton.ca, (613) 520-2600 ext. 1505). For any other concerns, please contact, Dr. Joanna Pozzulo (Chair, Department of Psychology, 1 (613) 520-2600, ext. 1412, psychchair@carleton.ca).

Is there anything I can do if I found this experiment to be emotionally upsetting?

Yes, if you feel any distress or anxiety after participating in this study there are a number of agencies that offer confidential services for Problem Gambling. A list of helplines by town and state can be found at

<http://www.ncpgambling.org/i4a/pages/index.cfm?pageid=1>.

Where can I get more resources on gambling research?

If you are interested in additional resources for gambling related resources, The National Center for Responsible Gaming <http://www.ncrg.org/> has a wealth of current research, information and confidential services for gambling and problem gambling research.

Additional resources can be found at <http://www.rgrc.org/en>

Thank you for participating in this study! We greatly appreciate your participation!

Appendix L: Reminder Email Templates**[Prior to 3-Month Follow-Up]****STUDY REMINDER!**

Thank you very much for participating in our study “Perceptions of Responsible Gambling”! We would like to remind you that in one month, you will receive the online link to complete the 3 month follow-up session. By completing this follow-up study, you will earn an additional **\$0.75** bonus reward!

If you complete this follow-up session, you will also receive an additional **\$1.00 BONUS!**

This study is being conducted by the Carleton University Gambling Lab. For more information, please contact Melissa at melissasalmon@cmail.carleton.ca.