

Temporal Focus as a Motivator of Self-Directed Change among People Engaging in  
Problem Gambling Behaviour

by

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## Abstract

Motivational strategies to facilitate behaviour change typically focus people living with addiction on a better possible future should the addictive behaviour be reduced or ceased. In contrast, emerging research suggests focusing people on positive aspects of the life one lived before addiction also has behaviour change utility. In the current program of research, I measured and manipulated temporal focus to systematically assess the process by which a focus on one's past or future motivates self-directed change as well as the limits and boundaries of each approach. In Study 1, a qualitative assessment of the meaning people living with problem gambling ( $N=57$ ) assign to their past before gambling and future without gambling revealed two distinct types of past (i.e., positive versus difficult) and anticipated future (i.e., optimistic versus ambivalent) experiences. Those with a positive past or optimistic future reported being more ready to change their gambling behaviour compared to those with a difficult past or ambivalent future. In Study 2 (correlational), problem gamblers ( $N=229$ ) who perceived their past before gambling to be more positive were more ready to change their behaviour to the extent that they felt nostalgic for their pre-addicted past. Moreover, participants who felt optimistic about their future without gambling were more ready to change to the extent that they felt a sense of longing for this better possible future. In Study 3, participants ( $N=273$ ) manipulated to focus on a positive past (versus an ordinary past) reported greater nostalgia for the pre-addicted past, which was associated with greater readiness to change. In Study 4, participants ( $N=174$ ) manipulated to focus on a positive future (versus an ordinary future) reported greater longing for a future without gambling, which was associated with greater readiness to change. Lastly, an integrated data analysis

testing the relative efficacy of a positive past and positive future in promoting readiness to change revealed no between-condition differences. Many people living with problem gambling are resistant to behaviour change. This program of research has significance by demonstrating when and for whom self-directed change can be advanced by way of focusing on a positive past and better possible future.

*Keywords:* gambling, addiction, behaviour change, temporal focus, nostalgia, longing.

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Temporal Focus as a Motivator of Self-Directed Change among People Engaging in  
Problem Gambling Behaviour

People living with addiction often do not behave in their best interest. Although they may objectively recognize their behaviour is causing them (and others) harm (see Lesieur & Custer, 1984; Petry, 2005), the rate of behaviour change is alarmingly low. Indeed, most people fail to produce even a single change attempt (DiClemente et al., 1991), let alone take the necessary steps to successfully quit an addictive behaviour (Miller & Rollnick, 2002). Moreover, very few people living with addiction seek professional treatment to assist in their recovery (Suurvali et al., 2008). Among those who do take action to change their behaviour, the vast majority engage in self-directed change (el-Guebaly et al., 2015; Hing et al., 2011; Slutske, 2006). However, the researchers who study addiction have been remarkably silent on (psychological) factors that guide people toward recovery in the absence of treatment (Klingemann et al., 2010). This lack of attention is even more striking given that self-directed change results in significant reduction in addiction-related harms (see Raylu et al., 2008).

The small body of research on self-directed change has focused mostly on motivational strategies that guide the person in need of change toward a better possible future (i.e., one without problems stemming from addictive behaviour). For example, Oettingen (2000) put forth the proposition that fantasies about a desired future can be used to create commitment to a goal, in turn leading people to take actions that are congruent with attaining that goal. Indeed, a future focus is associated with self-directed healthy living, less risk taking, and lower rates of substance abuse (Wills et al., 2001; Zimbardo & Boyd, 2006). In sum, the extant literature is relatively consistent in outlining

the health benefits of adopting a future focus. However, imagined futures among those living with addiction lack detail and contextual information, which may make it difficult for people to act in ways that are congruent with their desired future (Hodgins & Engel, 2002; Noël et al., 2017). Thus, a future focus may hinder self-directed change among some people engaging in addictive behaviour.

In contrast to traditional methods of promoting self-directed change, Miller and Rollnick (2002) proposed that readiness to change can be motivated by heightening the discrepancy between the current self and the self that existed before addiction entered the person's life. Recently, Wohl and colleagues (Kim & Wohl, 2015; Salmon et al., 2018; Wohl et al., 2018) have provided empirical evidence for this supposition. Specifically, they found behaviour change utility in focusing people living with addiction on the discrepancies between their past that was free of addiction (and addiction-related problems) and their current state. Importantly, they found that discrepancies between the past and present elicits a sentimental longing (i.e., nostalgic reverie) for the self that existed before the addiction took hold (Kim & Wohl, 2015), which increases the odds that people will take action to quit or cut down on their addictive behaviour over time (Salmon et al., 2018; Wohl et al., 2018). To the point, a past focus may motivate self-directed change because it motivates a desire to return to the life lived before the addictive behaviour entered their behavioural repertoire. However, many problem gamblers have experienced significant life hardships (Roberts et al., 2017) and view their past in a negative light (Hodgins & Engel, 2002), which may undermine the utility of a past focus. Thus, while both a focus on the pre-addicted self and a focus on a future free of addiction have motivating qualities for behaviour change, neither is a panacea.

Yet untested are the conditions under which a past focus (i.e., looking toward a nostalgic past) or a future focus (i.e., looking toward a better possible future) promotes readiness to change among people living with addiction. In the current research, I compared and assessed the self-directed behaviour change utility of both a past and future focus (measured and manipulated). I hypothesized that a past focus will have greater behaviour change utility among those who have a positive past to draw on (i.e., they perceive life lived before the addiction took hold to be positive) compared to those with a difficult past. This supposition is based on the existing nostalgia literature that has shown people feel nostalgic when the past is placed in a more positive light than the current self (Sedikides et al., 2015). Conversely, I hypothesized that a future focus will have greater behaviour change utility among those who feel optimistic about their future without the addictive behaviour (i.e., the future will be more positive if they took action to quit or cut down on their addictive behaviour) compared to those who feel resistant to such a future. This is because a desired future may create a goal in which people feel motivated to take action to achieve (Oettingen et al., 2001).

The current program of research will ultimately have value across addictive behaviours (indeed, elements of a past and future focus have both been shown to motivate self-directed change for an array of addictive behaviours). However, I plan to minimize noise that may be produced by varying the addictive behaviour from study to study and focus on a single addictive behaviour—problem gambling. In doing so, I methodologically determined the content, associations, and processes by which a past and future focus promote readiness to change among people engaging in problem gambling behaviour across a series of qualitative, correlational, and experimental studies. As the rates of change among people engaged in problem gambling behaviour are relatively low

compared to those of other addictive behaviours (Cunningham & Breslin, 2004; Suurvali et al., 2008), this population is in particular need of attention.

### **Professional Treatment is Underutilized**

Objectively, people who engage in an addictive behaviour should be able to recognize the resulting harms (e.g., disturbances in meaningful relationships, professional setbacks). However, a low percentage of people seek professional help despite the harms their addictive behaviour inflicts on the self and others. For example, only 36% of people with alcohol problems reported having ever sought help from professional treatment or community support groups (e.g., Alcoholics Anonymous) in their lifetime (Cunningham & Breslin, 2004). This low rate of treatment seeking is particularly concerning when coupled with the fact that delays in accessing treatment may lead to poorer treatment outcomes (Tavares et al., 2002) and a lower likelihood that addiction-related harms will be minimized or eliminated (Pulford et al., 2009). Among problem gamblers, seeking professional help is especially low. Whereas 36% of problem drinkers ever sought help for their addiction-related problems, Suurvali and colleagues (2008) found that only 18% of people with gambling problems accessed these services in their lifetime.

These low rates of treatment seeking may be due to the many barriers (real and perceived) that gamblers face. For instance, problem gamblers commonly report practical concerns about availability, accessibility, and a lack of awareness of local treatment services as external barriers to seeking professional help (Gainsbury et al., 2014; Hodgins & el-Guebaly, 2000). Additionally, many problem gamblers deny they have a problem (Dąbrowska et al., 2017; Evans & Delfabbro, 2005; Gainsbury et al., 2014). Although problem denial is not unique to those engaging in problem gambling behaviour, problem gambling does stand out in that there is a great deal of public misunderstanding (or

denial) of gambling as an addictive behaviour. One reason is that, unlike other addictions, gamblers are not ingesting any substances, thus people tend to think that gamblers lack self-control because it is just a game (see Hing et al., 2014; Hing et al., 2016). Such a sentiment (if internalized) may hinder behaviour change because the person may believe he or she can stop gambling at any time (Hing et al., 2016). Indeed, many gamblers erroneously feel that they are in control of their gambling behaviour (Liang, 2013).

Behaviour change among problem gamblers is also hindered by an illusory sense of control over gambling-related outcomes (Wohl et al., 2005; 2007). Gamblers who fall victim to illusory perceptions of control may falsely believe that continued gambling can help them to alleviate financial problems. Whilst this may be true over the short-term, the odds suggest people will lose money gambling over the long-term. However, the net effect is that illusion of control undermines motivation to seek professional help (Evans & Delfabbro, 2005; Hing et al., 2015). In fact, illusory sense of control over gambling outcomes has been argued to be a central reason why gamblers are unwilling to admit their problems and delay treatment until such time that they can no longer manage the negative consequences of their gambling (Clarke et al., 2007; Evans & Delfabbro, 2005; Suurvali et al., 2008; Tavares et al., 2002).

People engaging in problem gambling behaviour can and do recognize their behaviour is in need of change in the absence of a crisis. However, feelings of stigmatization, shame, embarrassment, and pride are common culprits that undermine treatment seeking among those who recognize their gambling has become problematic (Evans & Delfabbro, 2005; Hing et al., 2015; Khayyat-Abuaita et al., 2015; Liang, 2013). These negative feelings often stem from the aforementioned misunderstanding of gambling as an addiction. Many gamblers internalize the stigma surrounding gambling

addiction, leading them to be less forthcoming about their problems because they believe that recovery is a matter of willpower (Hing et al., 2016). For example, Hing and colleagues (2015) found that behaviour change for problem gambling may be impeded by the idea that seeking treatment equates to admitting “weakness”. In fact, problem gamblers who internalized shame may purposefully avoid treatment to prevent family, friends, or co-workers from potentially finding out about their problems (Evans & Delfabbro, 2005). The net result is that gamblers are relatively unlikely to seek formal treatment when they feel that they lack social support (Hing et al., 2015), and express a desire to handle the problem on their own (Hodgins & el-Guebaly, 2000).

### **Self-Directed Change is the Preferred Route**

Recovery from addiction can happen without formal treatment. Although some people simply mature out of problematic behaviours (i.e., natural recovery), others make conscious decisions to quit or cut down (Klingemann & Sobell, 2007). Among problem gamblers, self-directed change (both natural and deliberate) is a common avenue of behaviour change (Slutske, 2006; Slutske et al., 2009). In fact, rates of recovery are higher among those who engage in self-directed change than among those of professional service use because self-directed change circumvents many of the barriers associated with seeking professional treatment (Gainsbury & Blaszczynski, 2011; Hodgins & el-Guebaly, 2000). Indeed, to avoid the shame and stigma that commonly undermine gamblers’ willingness to seek formal treatment, most gamblers prefer to handle their problem on their own (Hodgins & el-Guebaly, 2000). Because self-directed change is characterized by being under one’s personal control, gamblers can independently customize their self-help strategies (e.g., self-assessment, managing finances, and

accessing help service websites; Lubman et al., 2015) to determine what is most helpful to them.

Importantly, self-directed change typically yields successful outcomes (Dickerson et al., 1990; Hodgins et al., 2001; Kushnir et al., 2018). For example, Kushnir and colleagues (2018) found that problem gamblers who were seriously thinking of quitting or cutting back on their gambling behaviour without formal treatment reported engaging in fewer gambling activities and spending less money on gambling games over an 18-month period. Importantly, this self-directed change resulted in reduced severity of their gambling problems. Moreover, reductions in gambling severity during the first year were maintained at the 18-month follow-up. Hodgins and colleagues (2001) also demonstrated that problem gamblers showed significant improvements over a one-year period (e.g., reduction in days gambled, money lost, money gambled) in the absence of formal treatment, regardless of whether they were assigned to receive a motivational enhancement telephone interview, a self-help workbook, or the waitlist control condition. To the point, self-directed change is a significant pathway to recovery from addiction-related problems, which can lead to meaningful behaviour change in a relatively short duration (Hodgins et al., 1999; Kushnir et al., 2018).

Despite the benefits of engaging in self-directed change, there is a paucity of evidence examining psychological factors that motivate people to initiate the process of self-directed change (see Klingemann et al., 2010 for a review). Indeed, research attention has been focused on *how* people change. For example, the transtheoretical model (TTM; DiClemente et al., 1991) of behaviour change describes one's motivational and behavioural progression throughout five stages: pre-contemplation, contemplation, preparation, action, and maintenance. People progress through the stages of change in a

cyclical manner (Prochaska et al., 1992), and move closer to or farther away from recovery depending on the extent to which the perceived harms of engaging in the addictive behaviour outweigh the benefits (Velicer et al., 1985). Though the TTM accurately describes the process of self-directed change among problem gamblers (DiClemente et al., 2000; Hodgins, 2001), it lacks an understanding of *why* people change (Kushnir et al., 2016). Herein, I put forth the presupposition that temporal focus—the temporal direction (future versus past) the person is focused on—may play a role in motivating change from problem gambling behaviour.

### **Future Focus: Looking Forward to Motivate Change**

People have schemas of who they have been in the past, who they are now, and who they may be in the future. These temporal schemas can be used to recall past events, create expectations or goals for future events, or understand the realities of present events (Zimbardo & Boyd, 2015). Boyd and Zimbardo (2005) posit that people can have a dispositional focus on one or more temporal orientation. People who are past-focused often find themselves reliving times that have gone by, whereas people who are future-focused tend to set more attainable future goals and can more easily resist temptation (Przepiorka & Blachnio, 2016; Zimbardo & Boyd, 2008). Having a future focus has been associated with many favourable health outcomes (see Boyd & Zimbardo, 2005), likely because future-focused people have a higher consideration for future consequences. Indeed, those who are future-focused tend to be more motivated, take less risks, and adopt healthier lifestyles (Boyd & Zimbardo, 2005).

A future focus is also predictive of lower rates of engagement in a variety of addictive behaviours (see Keough et al., 1999). For instance, a future focus has been related to less substance use among adults (Apostolidis et al., 2006; Keough et al., 1999),

as well as lower rates of cannabis use among adolescents (Wills et al., 2001). A future focus has also been shown to act as a buffer against Internet and Facebook addiction (Przepiorka & Blachnio, 2016). Moreover, a greater consideration of future consequences is associated with lower odds of reporting problematic drinking behaviours among university students (Beenstock et al., 2010).

In addition to the evidence linking temporal orientation to the uptake of addictive behaviours, there is also work to show that a future focus can influence self-directed change. For example, smokers with a future focus at a baseline assessment were more likely to report having made a quit attempt within eight months (Hall et al., 2012), as well as having quit smoking four years later (Adams, 2009). This may be why many traditional theories of behaviour change have focused on motivational strategies that focus the person in need toward a better possible future.

In support of how a future focus may facilitate self-directed change, Oettingen's (2000) model of fantasy realization outlines how fantasies about a desired future can be used to create strong commitment to a goal, which leads people to take action toward attaining that goal (Oettingen et al., 2001). According to Oettingen (2000), mental contrasting between the future and present is accomplished by first imagining a desired future (e.g., a future without addiction-related problems) and then reflecting on the negative reality that is impeding that future (e.g., financial loss due to excessive gambling). Pairing positive thoughts about the future with negative thoughts about current lived experiences makes both future and present simultaneously accessible (Kawada et al., 2004). This allows people to recognize the negative reality that is impeding them from realizing their desired future (Higgins & Chaires, 1980), thereby

emphasizing a necessity to take action to overcome the present reality in order to attain the desired future (Oettingen, 2000).

Oettingen's model has been applied to addictive behaviours with some success. For example, Oettingen and colleagues (2010) showed that when smokers engaged in mental contrasting of a positive future without smoking with the negative reality of smoking, they took action to reduce their cigarette consumption. Action occurred only when participants had high expectations of success—those who had low expectations of success deferred behaviour change. Moreover, Johannessen and colleagues (2012) found that dieting students were more likely to act in ways congruent with their diet goal (e.g., eating fewer high-calorie foods and more low-calorie foods, being more physically active) when they engaged in mental contrasting of a desired future with the negative reality. Taken together, these results provide some indication that looking forward to a desired future (i.e., without an addictive behaviour) and contrasting it with the negative reality can lead people to take action toward quitting or cutting down on that behaviour (Oettingen et al., 2010).

In a like manner, Markus and Nurius' (1986) theory on possible selves elucidates the role of a future focus in overcoming problematic behaviours. They argue that possible selves function as incentives for future behaviour in that there are possible selves to be approached (i.e., a desired future self) or avoided (i.e., a feared future self). In making possible selves salient, people may be motivated to change their behaviour through comparisons of the current self against these possible selves (Markus & Nurius, 1986; Oyserman et al., 2004; vanDellen & Hoyle, 2008). For example, people who were future-focused (i.e., higher tendency to consider future consequences) increased their exercise behaviour over time after their possible selves were made salient (Ouellette et al., 2005).

Hooker (1992) also found that adults with a desired, health-related possible self engaged in more health-related behaviours than did those who did not have a possible future self in this domain. Indeed, lacking clear possible selves can also have consequences for behaviour. Oyserman and Markus (1990) found that juveniles without well-developed possible selves were more likely to have engaged in delinquent behaviour over time. Taken together, a future focus may be most effective in motivating self-directed change when people are oriented toward a desired future without the addictive behaviour.

### **Past Focus: Looking Back to Motivate Change**

At the heart of many behaviour change models is a recognition of how the addictive behaviour is negatively affecting the self (Markus & Nurius, 1986; Miller & Rollnick, 2002; 2012; Oettingen, 2000). Indeed, addiction often results in negative changes to people's moods, behaviours, and self-esteem (Bergh & Kühlhorn, 1994; Lesieur & Custer, 1984). These changes can cause people to feel disconnected from who they were before the addiction took hold (i.e., they feel self-discontinuous). For example, Toneatto and colleagues (2008) found that many people living with problem gambling experienced a crisis in self-image—a crisis that stems from a struggle to reconcile their identity with the gambling problems they faced. Although these feelings of self-discontinuity often represent a discontentment with the current self (Davis, 1979; Sedikides et al., 2008), the realization of how an addictive behaviour is worsening one's quality of life is pivotal to understanding that behaviour change is in one's best interest.

Of note, the extant literature supports the role of discontinuity in self-directed change. Toneatto and colleagues (2008) reported that this crisis in self-image was one of the main reasons gamblers chose to quit or cut down on their behaviour. Moreover, Kim and colleagues (2017) found that feelings of self-discontinuity were associated with a

greater likelihood of having attempted self-directed change over time, even when controlling for known barriers to change (e.g., shame, guilt, self-stigma). Nuske and Hing (2013) also reported anecdotal evidence that suggests behaviour change (in the context of problem gambling) as being a function of perceiving the past (non-addicted) self in a positive light. That is, some problem gamblers are motivated to engage in self-directed change after contrasting the positive past against the negative present reality of living with addiction. Although self-discontinuity, by definition, compares and contrasts the current self with the past self (Davis, 1979; Sani, 2008), mention of the past self is typically absent from many behaviour change modalities (see Salmon et al., 2017). Given that self-discontinuity is associated with positive behaviour change among people living with addiction, looking back to a more positive past (before the addiction took hold) may be an untapped avenue for self-directed change.

The clinical literature provides some clues about why a focus on a positive past may motivate change. Miller and Rollnick (2002), for example, argued that in addition to focusing clients on the future, behaviour change can also be facilitated by encouraging reflection on the past. This technique involves motivating the client (e.g., a problem gambler) to remember their life before problems with their addictive behaviour emerged and contrasting those memories with how their life is now. According to Rosengren (2009), this process helps the person living with addiction re-establish values and reaffirm goals for the future. Therefore, it would stand to reason that looking back to a more positive life lived *before* problems arose due to their gambling may be a viable means to motivate self-directed change. To the point, self-directed change may be a product of thoughts about how one's addictive behaviour has worsened with time, coupled with a longing to regain what was lost (e.g., values) as a result of addiction.

In fact, longing to return to a more positive past is a natural response to negative self-change (Best & Nelson, 1985; Davis, 1979; Sedikides et al., 2015). Put another way, feeling that the self has fundamentally changed for the worse (i.e., feeling self-discontinuous) elicits nostalgic reverie (i.e., a sentimental longing) for a more favourable past (Sedikides et al., 2015). Indeed, nostalgia is colloquially understood to be a positive emotional response to thoughts of days gone by. Nostalgia places the past in a good, idealistic light, which is contrasted against the stress of the life currently lived (Davis, 1979). Importantly, nostalgic reflection serves as a resource for psychological well-being (Routledge et al., 2013). Among other benefits, people who engage in nostalgic reflection report increased feelings of social connectedness, heightened self-esteem, and positive affect (Vess et al., 2012; Wildschut et al., 2006).

Additionally, nostalgia helps people to regain a sense of meaning in life (Routledge et al., 2011) and increases optimism for the future (Cheung et al., 2013). It does so by re-establishing a sense of continuity (Sedikides et al., 2015). In other words, although nostalgia initially stems from the perception that the current self is worse off than the past self, engaging in nostalgic reflection can help people feel closer to their favourable past self. This, in turn, promotes a regained sense of self-continuity (Sedikides et al., 2015). Due to the many benefits associated with nostalgic reverie, it has been argued that nostalgia is an active coping resource (Sedikides et al., 2009) that motivates action to positively address life stressors (Stephan et al., 2014). In this way, nostalgia is functional in that it engenders approach motivation (Abeyta et al., 2015; Sedikides & Wildschut, 2016; Stephan et al., 2014).

Among people living with addiction, the functionality of nostalgia should manifest in motivation to reclaim the life lived before their addictive behavior become

problematic. As noted by Berg and Miller (1992), problem in treatment often refer to their past nostalgically when asked to describe a future absent of addiction. This may be because the past provides people with a concrete image of what life looked like before the addiction took hold (Reith & Dobbie, 2012). Specifically, nostalgia draws the person living with addiction closer to the more favourable past that existed before the development of problems associated with the addictive behaviour. Because nostalgia restores a sense of self-continuity among people who feel that there has been fundamental self-change (Sedikides et al., 2015), nostalgic reverie for the pre-addicted self should motivate self-directed behaviour targeted at recapturing the longed-for past. In other words, nostalgia for the pre-addicted self should motivate people to quit or cut down on the addictive behaviour that caused the discontinuity in order to re-establish a sense of self-continuity.

Providing empirical support for the self-directed change utility of nostalgia, Kim and Wohl (2015) found that among problem gamblers, as well as problem drinkers, a sense self-discontinuity (measures and manipulated) heightened nostalgic reverie for the pre-addicted self. Importantly, nostalgia for the for the pre-addicted was positively associated with readiness to change. More recently, Wohl and colleagues (2018) demonstrated that experimentally-induced nostalgia (stemming from self-discontinuity) has the power to motivate quit attempts over time among problem gamblers (Study 1) and problem drinkers (Study 2). Specifically, participants who were asked to reflect on how their gambling (or drinking) has fundamentally altered their sense of self (versus a control group who were asked to reflect on how the self has been unchanged by gambling) reported greater feelings of nostalgia for the pre-addicted self, and were more likely to report making an attempt to quit or cut down on their gambling one month later.

These findings were confirmed by collaterals (i.e., a close friend or family member).

Taken together, self-directed change can be motivated among some people who live with addiction when they feel a sense of longing for the past that was free of addiction.

### **Looking Forward and Looking Back: What are the Limiting Conditions of Each Temporal Focus?**

The extant literature points to the benefits of both a future and past focus for motivating self-directed change. However, there may be limits to the effectiveness of each temporal focus. Specifically, problem gamblers may find it difficult to adopt a future focus. This is because a skewed temporal orientation is one of many cognitive distortions that are characteristic of problem gambling (Toneatto, 1999). Specifically, problem gamblers tend to be present-focused (MacKillop et al., 2006), and lack consideration for the future consequences associated with their betting decisions (Hodgins & Engel, 2002). Hodgins and Engel (2002) found that problem gamblers have significantly shorter time horizons in comparison to recreational gamblers and were less likely to predict events far into their future. These findings suggest that problem gamblers may have difficulty planning for their future. Moreover, imagined future events among problem gamblers typically lack detail and contextual information (Noël et al., 2017), which further undermines the planning process. As such, focusing gamblers on a better possible future may not be the most effective means to motivate self-directed change if they are resistant to such a future.

A past focus is also likely not a panacea. That is, for many people living with addiction, the onset of addictive behaviour can stem from difficulties in the past, which can include relationship strain, poverty, and trauma, among others (Hellman et al., 2015). Problem gambling in particular has been linked to the experience of more traumatic

events in one's past (Bergevin et al., 2006; Roberts et al., 2017). For example, Luce and colleagues (2016) found that experiencing more hardships in life was associated with increased problem gambling severity over time. This may be why problem gamblers tend to view their past more negatively than do recreational gamblers (Hodgins & Engel, 2002). Because gambling facilitates dissociation (i.e., detachment from physical and emotional experiences; see Griffiths et al., 2006), some people use gambling as a means to escape or cope with these negative life experiences (Stewart & Zack, 2008). In other words, those whose lives before gambling are filled with negative life events should be reluctant to return to their past lived experiences. For these people, a focus on a more positive past is likely not to motivate self-directed change.

The literature outlining the benefits of a past and future focus has largely overlooked the experiences of gamblers who report histories of negative life events as well as those who may feel resistant toward a future that involves complete cessation of gambling behaviour (Salmon & Wohl, 2020). That is, many studies have assumed the pre-addicted past is a positive time in which people are motivated to return to (Kim & Wohl, 2015; Salmon et al., 2018; Wohl et al., 2018), or that a future without the addictive behaviour will be a positive time that people are motivated to attain (Johannessen et al., 2012; Oettingen, 2000; Oettingen et al., 2010). In the proposed program of research, I assessed the limits and boundaries of a past and future focus on motivating readiness to engage in self-directed change. Specifically, I examined whether variations in gamblers' lived past experiences before gambling and anticipated future experiences without gambling dictate the efficacy of how a past or future focus may motivate action toward change. In doing so, I addressed a significant gap in the literature by also examining

whether it is possible to induce a positive past or positive future among those who may not readily perceive these temporal dimensions to be positive.

### **Overview**

Although many people gamble without developing problems, a small but significant portion of people gamble to excess (i.e., at problematic levels), yielding an array of troubles including, among other things, financial loss, physical and psychological health problems, family problems, and legal difficulties (Bergh & Kuhlhorn, 1994; Fong, 2005; Hodgins et al., 2011; Petry & Armentano, 1999). Approximately 2.0% of the Canadian population experience gambling-related problems (Cox et al., 2005), with global prevalence estimates as high as 3.3% (Stucki & Rihs-Middel, 2007). Work by Browne and colleagues (2017) has shown that the harms associated with problem gambling are so severe that problem gamblers tend to report that they would prefer to live a shorter life without gambling-related problems than a longer life with said problems. Given the severity of these implications, problem gambling is a public health concern in need of redress.

Traditionally, both basic and applied research and theory on behaviour change (including self-directed change) have argued that change can be accomplished by focusing on a better possible future (Fishbein & Ajzen, 2010; Miller & Rollnick, 2012; Oettingen, 2000). Importantly, this future focus has yielded successful outcomes for those engaging in addictive behaviour (Johannessen et al., 2012; Oettingen et al., 2010). As previously noted, a growing body of evidence has also shown that a past focus (one that facilitates nostalgic reflection) functions to motivate change (see Kim & Wohl, 2015; Salmon et al., 2018; Wohl et al., 2018). The power of nostalgic reverie for the pre-addicted self to motivate behaviour change is particularly striking because motivating

change for addictive behaviours (e.g., cigarette smoking, problem drinking, problem gambling) can be extraordinarily challenging (DiClemente, 1993). However, still unknown is under what conditions a past focus and future focus are more apt to motivate self-directed change. To best support problem gamblers in making self-directed changes to their gambling, we must provide access to tools that have the greatest utility for enhancing readiness and, in turn, actual behaviour change.

In the current program of research, I direct needed research attention on the conditions that make a past focus versus a future focus better able to facilitate self-directed behaviour change. I will do so by both assessing (qualitatively and quantitatively) and manipulating temporal focus among a sample of community problem gamblers who are not seeking treatment for their gambling-related problems. I contend that readiness to quit or cut down on problem gambling behaviour may be motivated to the extent that gamblers perceive elements of their past and future to be positive. Importantly, I expect that a past focus will be a more powerful facilitator of self-directed change when gamblers can readily draw upon positive lived experiences before their gambling became problematic. However, a past focus may be undermined when the pre-addicted past is perceived in a negative light. Similarly, I expect that a future focus may be an effective avenue to motivate self-directed change when gamblers feel optimistic about a future without problem gambling. However, feelings of hesitancy toward a gambling-free future may also undermine the behaviour change utility of this approach.

### **Study 1: A Numerically Aided Phenomenological Assessment**

In Study 1, a numerically aided phenomenology approach was used to assess the specific meaning problem gamblers give to their lived past experiences before gambling became problematic, and their imagined futures when their gambling will no longer be

problematic. Numerically aided phenomenology (see Kuiken & Miall, 2001) is a procedure for describing different kinds of lived experiences within a set of qualitative narratives. Through comparative reading of each narrative, the researcher is able to identify recurring expressions and paraphrase them to create categories of shared meaning. These categories of shared meaning are then systematically grouped together to form clusters (i.e., overarching groups) according to the similarities in their profiles of meaning expressions. The resulting clusters are recorded as a new categorical variable that allows for independent samples testing to determine whether participants in each cluster differ statistically on various quantitative (i.e., close-ended) outcome measures. In other words, numerically aided phenomenology allows for the quantification of qualitative data to allow for further quantitative testing.

Using a numerically aided phenomenology approach, I examined how the various meanings assigned to gamblers' lived pasts and anticipated futures group together to form clusters according to the similarities in their profiles of meaning expressions. Moreover, I examined how these clusters of shared experiences relate to gamblers' emotions and perceptions of these temporal dimensions, as well as the extent to which people are ready to change their gambling behaviour. This was accomplished by asking community-based, non-treatment seeking problem gamblers to write short essays about their lived experience with gambling, along with either their past experiences before gambling became problematic or their anticipated future should they remove gambling from their behavioural repertoire.

This qualitative investigation was largely exploratory and intended to provide rich data regarding the ways in which gamblers think and feel about their pre-gambling self as well as their post-gambling self. Focus was placed on the similarities and differences

between the various types of lived experiences gamblers shared before their gambling became problematic. Whereas some gamblers may perceive their past before gambling as a generally positive time that they long to return to (i.e., they feel nostalgic for this time in their life), other gamblers may perceive the past as a place of pain that they are trying to avoid. Additionally, I examined the similarities and differences between gamblers' outlooks toward their future. Whereas some gamblers may look forward to a future free of gambling, others may experience anxiety when tasked with envisioning a future without gambling. After providing their narratives, participants completed a questionnaire that further assessed their perceptions of their past and future (e.g., emotions associated with each temporal dimension). This questionnaire helped facilitate a more complete understanding of the meaning assigned to each temporal orientation. Ultimately, Study 1 formed the basis of the concepts to assess perceptions of each temporal focus in follow-up studies.

## **Method**

### **Participants**

Participants were recruited from Amazon.com's Mechanical Turk (MTurk). MTurk allows "workers" to complete small tasks for monetary compensation. Buhrmester and colleagues (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 provides a reliable and diverse participant pool that behaves in ways consistent with known effects in psychology (Crump et al., 2013), and has been shown to be a reliable and valid means to recruit gamblers, drinkers, and cannabis users (Kim & Hodgins, 2017).

Participation on MTurk was limited to those who 1) were residents of the United States, 2) have spent at least \$100 on gambling activities (e.g., slot machines, poker, roulette, sports betting) in the past 12 months, 3) think they have problems with their gambling (e.g., spend too much time or money gambling), and 4) were not in treatment for their gambling. Moreover, participation was also limited to those who reported at least one symptom of problem gambling using an adapted version of the NODS-CLiP (Toce-Gerstein et al., 2009). The purpose of screening participants was to ensure that enough problem gamblers (i.e., the target sample) were present in the study. The NODS-CLiP is a standardized diagnostic interview instrument to assess problem gambling and has been shown demonstrate convergent validity 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: “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 loses – a central characteristic of problematic gambling (APA, 2013). Based on these inclusion criteria, I recruited 60 community gamblers (33 male, 27 female) who were not seeking treatment for their gambling problems. Participants’ age ranged from 21 to 73 years ( $M = 34.05$ ,  $SD = 9.90$ ).

The sample size for Study 1 was determined based on the recommendations of Kuiken and Miall (2001) to have at least 20 participants per hypothesized theme. Because

two general themes (past focus and future focus) were to be examined, a sample size of 40 participants was determined to be appropriate. I added 10 participants to each theme ( $N = 60$ ) to account for any poor data quality (e.g., insufficient or unclear responses).

At recruitment, participants were informed that they would earn US \$3.00 for completing the study (approximately 30 minutes in duration). Due to the cognitive demands of the writing tasks, we provided a compensation rate that is higher than what is typically offered on MTurk for psychological studies with a duration of 30 minutes (Buhrmester et al., 2011; Sheehan, 2018). Of note is that payment rates on MTurk do not typically affect the quality of data collected, but rather the speed of data collection (Keith et al., 2017).

Because the purpose of this study was to examine how problem gamblers think and feel about their past before gambling as well as their possible future without gambling, the sample used for analysis was further limited to only participants who exhibited moderate to high-risk gambling symptomatology. From the original sample of 60 participants, one participant was categorized as a low-risk gambler using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001), and thus was excluded from the analyses. Furthermore, two participants were also excluded from the subsequent analyses due to insufficient responses (i.e., they did not follow the writing prompts). Thus, the final sample for Study 1 consisted of 57 moderate and high-risk gamblers (31 male, 26 female), ranging in age from 21 to 73 years ( $M = 34.09$ ,  $SD = 10.05$ ).

### **Procedure and Measured Variables**

A recruitment notice (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 (Appendix B), explaining the nature of the qualitative study. All consenting participants were subject to eligibility criteria (Appendix C). Participants who failed the eligibility criteria were re-directed to an ineligibility script (Appendix D) and were unable to continue with the survey.

Eligible participants continued to the full survey (see Appendix E for measures). Participants first reported their demographics (e.g., age and gender) as well as general information about their gambling behaviour (e.g., time and money spent gambling). I then presented participants with a brief preface asking them to “please read the instructions carefully and provide honest responses” before completing a series of writing tasks. To better understand how various aspects of the participants’ lives have been affected by their gambling behaviour, all participants were asked to spend five minutes writing about a “particular experience or event that best represents how gambling has influenced your life”.

Participants were then randomly assigned to either a past focus or a future focus condition. In the past focus condition, participants were first presented with a writing prompt. Specifically, participants were asked to “take some time to think about what your life was like before your gambling became problematic” and spend the next 10 minutes writing about this past. To increase the breadth of responses, additional prompts were included (i.e., “What filled your days? What were your relationships with others like? What were you like?”). A timer counting up was included on this survey page so that participants could keep track of how long they were writing for. After submitting their response, participants were then given the opportunity to add more to their story should they choose to.

Participants in the past focus condition were then presented with a series of face-valid items assessing various emotions and outcomes associated with their life before problematic gambling. Specifically, participants responded to items assessing the clarity and vagueness of one's past (i.e., "The life I lived before my gambling became problematic is vivid (i.e., clear) in my mind", "The life I lived before my gambling became problematic is vague (i.e., fuzzy) in my mind"), longing (i.e., "I long for the life I lived without problematic gambling"), positive and negative emotions (e.g., "When gambling wasn't problematic, I felt safe and secure in my life", "It makes me feel anxious to think about the life I lived without gambling"), a sense of meaning (i.e., "The life I lived before I started gambling problematically was full of meaning") and social connectedness (i.e., "Before my gambling became problematic, I felt more love in my life"). All items were anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Participants were also asked to list the things they longed for most when thinking about their life before gambling became problematic. Participants were encouraged to list as many things as they can think of in no particular order.

In the future focus condition, participants were presented with a similar writing prompt that was tailored toward a possible future that would result from gambling cessation. Specifically, they were asked to "take some time to think about what your life would look like if you decided to change your problematic gambling" and spend the next 10 minutes writing about this future. To increase the breadth of responses, additional prompts were included (i.e., "What would fill your days? What would your relationships with others be like? What would you be like?"). A timer counting up was included so that participants could keep track of how long they were writing for. After submitting their

response, participants were then given the opportunity to add more to their story should they choose to.

Participants in the future focus condition were then presented with a similar series of face-valid items assessing various emotions and outcomes associated with their future life without gambling. Specifically, participants responded to items assessing the clarity and vagueness of one's future (i.e., "The life I would live after my gambling is no longer problematic is vivid (i.e., clear) in my mind", "The life I would live after my gambling is no longer problematic is vague (i.e., fuzzy) in my mind"), longing (i.e., "I long for the life I would live without problematic gambling"), positive and negative emotions (e.g., "When my gambling is no longer problematic, I will feel safe and secure in my life", "It makes me feel anxious to think about the life I would live without gambling"), a sense of meaning (i.e., "The life I would live after I stop gambling problematically will be full of meaning") and social connectedness (i.e., "After my gambling is no longer problematic, I will feel more love in my life"). All items were anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Thereafter, participants listed the things they longed for most when thinking about what their life would look like if they decided to change their problematic gambling. Participants were encouraged to list as many things as they can think of in no particular order.

All participants then completed Biener and Abrams' (1991) single-item pictorial contemplation ladder, adapted for problem gambling. Though the contemplation ladder was originally developed to assess readiness to quit smoking, it has been shown to be a strong measure of gamblers' readiness to change (Hodgins, 2001; Kim & Wohl, 2015). 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*). A score of 0 to

3 corresponds with DiClemente and colleagues' (1991) pre-contemplation stage of change (i.e., not thinking about change), a score of 4 to 6 corresponds with the contemplation stage (i.e., thinking about change), a score of 7 or 8 corresponds with the preparation stage of change (i.e., preparing to change within the next 30 days), and a score of 9 or 10 is indicative of the action and maintenance stages, respectively (i.e., actively modifying unhealthy behaviour). Following the contemplation ladder, participants also expressed their desire to change their gambling on a scale from 0 (*no desire*) to 9 (*full desire*).

Participants were then asked whether they had previously made a quit attempt. This item was: "Have you ever made an attempt to quit or cut down on your gambling?" Responses to this item were dichotomous (*yes* or *no*). Follow-up open-ended items were also included for participants who responded in the affirmative. Specifically, participants in the past condition were asked to spend five minutes writing about "how memories of your life before gambling became problematic have influenced your attempt to quit or cut down on your gambling." Participants in the future condition were asked to spend five minutes writing about "how these thoughts of the life you would live without gambling have influenced your attempt to quit or cut down on your gambling." These open-ended items were included with the exploratory intention of gaining further insight into how one's past and future might influence the process of behaviour change.

Lastly, participants completed the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The PGSI is a continuous nine-item measure ( $\alpha = .85$ ) that assesses problem gambling behaviour (e.g., "Have you needed to gamble with larger amounts of money to get the same feeling of excitement?") and the consequences of problem gambling (e.g., "Have you felt guilty about the way you gamble or what happens

when you gamble?”). Responses were 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 high-risk gambler. Participants were then directed to the debriefing page (Appendix F) where the full nature of the study was disclosed.

This research was reviewed and cleared by the Carleton University Research Ethics Board-B (CUREB-B Reference #108822).

### **Analysis of the Experiential Narratives**

I first read all narratives in both conditions to become acquainted with the participants' narratives about their life before gambling became problematic and their anticipated future without problematic gambling. Participants' experiential narratives were then systematically compared by myself and two research assistants to identify similarly expressed meanings (see Kuiken & Miall, 2001 for a detailed description of these procedures). Discrepancies in the interpretation of the participants' narratives were reviewed by all three judges and consensus was reached through discussion. When sentences with similar meaning occurred in three or more narratives, they were paraphrased to reflect as much of their common meaning as possible. For example, the following statements from three different narratives were understood to express a common meaning: (1) “I was a person full of life”, (2) “I was a very sweet person”, and (3) “I was actually a real person”. The meaning that these statements had in common was paraphrased to reflect as much of their shared meaning as possible: ‘I was a better person before my gambling became problematic’. The wording of such paraphrases, called

constituents, was established by making strict comparisons between similar meanings shared by these expressions within the set of narratives.

When a constituent was identified, each narrative within the dataset was systematically reread to determine whether the expressed meaning was present or absent. Through repeated readings, an array of 12 such constituents were identified for the past condition, and 12 constituents were identified for the future condition. Each of the constituents identified were neither rare (i.e., found in less than 10% of the narratives) nor ubiquitous (i.e., found in more than 90% of the narratives). The resulting arrays of constituents by participants for both conditions were subjected to an increase in sum of squares (Ward's) hierarchical cluster analysis (using squared Euclidian distance coefficients). For the past condition, the cluster analysis on the 12 X 31 array revealed two distinct clusters of experiential narratives of one's past before gambling. For the future condition, the same hierarchical cluster analysis on the 12 X 26 array also revealed two distinct clusters of experiential narratives of one's anticipated future without gambling.

Hierarchical cluster analysis is a method for mapping the distances among people or variables according to the distance metric and linkage measure chosen by the researcher (IBM Knowledge Center, 2019). Though the distances used in hierarchical cluster analysis are assumed to be derived from continuous data (Anderberg, 1973; Finch, 2005), hierarchical cluster analysis has been shown to perform well with binary data using Ward's linkage measure with squared Euclidian distance coefficients (Henry et al., 2015; Tamasauskas et al., 2012). Importantly, hierarchical cluster analysis is deemed appropriate for sample sizes as low as  $n = 20$ , and consistently produces reliable cluster structures in comparison to latent class analysis and k-means cluster analysis when using

samples smaller than  $n = 50$  (Henry et al., 2015). Lastly, hierarchical cluster analysis is a useful method to determine an appropriate number of clusters in lieu of prior expectations, which can then be followed up with another method of sorting cases into a specified number of clusters (Mandara & Murray, 2002).

After Ward's method identified two distinct cluster centres for both the past and future conditions, I used a two-step cluster analysis (using the log-likelihood measure) to sort the cases into the two clusters for both conditions. This two-step cluster analysis resulted in clusters with 20 and 11 members for the past condition, and clusters of 11 and 15 members for the future condition. Two-step cluster analysis allows the researcher to specify the number of clusters a priori, and then sorts cases using two steps: participants are first sorted into sub-clusters, and the sub-clusters are then re-sorted into the desired (final) number of clusters (IBM, 2019). Importantly, two-step cluster analysis using the log-likelihood distance measure is recommended for sorting binary data as opposed to k-means cluster analysis, which is only recommended for continuous data (IBM, 2019). Lastly, two-step cluster analysis produces a silhouette coefficient of cohesion and separation, which provides a measure cluster quality by assessing how similar each case is to its own cluster (i.e., cohesion) compared to the other cluster (i.e., separation). With possible scores ranging from -1 to 1, a silhouette coefficient of .4 for the past condition and a silhouette coefficient of .3 for the future condition were both deemed to be of fair cluster quality.

## Results

A summary of demographics and self-reported gambling behaviour in each condition can be found in Table 1. In both the past and future conditions, the prevalence of each constituent across clusters was compared to identify the constituents that

differentiated one cluster from the other. A constituent was determined as differentiating if 1) it occurred in at least three members of the cluster; 2) it occurred at least twice as often as in the other cluster; and 3) the proportion of individuals expressing it within a cluster was greater than the proportion expressing it in the other cluster using the chi-square statistic ( $p < .05$ ) as criterion. As clustering techniques maximize between-cluster differences, it should be noted that the chi-square statistic was only used descriptively to determine significant differences in the proportion of constituent expressions rather than for testing significant departures from group equivalence (Everitt et al., 2004).

### **Past Condition**

The characteristic attributes of each cluster, along with the non-differentiating characteristics, are summarized in Table 2. Example excerpts from narratives whose profiles most nearly resembled the ideal type for each cluster are also presented in the summary descriptions that follow.

**Cluster I.** Participants in the first cluster ( $n = 20$ ) indicated a major shift between their past before gambling became problematic and their life now (Constituent 5), suggesting that the presence of gambling became overwhelming (e.g., “Gambling took over my life”; “Gambling changed my life completely”). As a result of this felt discontinuity between past and present, people perceived that their life before gambling was generally more positive (Constituent 1; e.g., “Life was calmer”; “I used to enjoy life a lot more”), suggesting that gambling has changed their life for the worse (e.g., “Everything has become harder for me”; “I had fewer problems”). Within this positive (pre-problematic gambling) past, almost everyone mentioned specifically that they were more socially connected before their gambling became problematic (Constituent 2). These social connections referred to time spent with family and friends (e.g., “I played

sports with friends”; “Quality family times which ought to be spent together are not as numbered as before”), having more open and trusting relationships (e.g., “My husband and kids could trust me”; “I was unselfish and generous to my friends”), or having established relationships that have since declined or have been lost altogether (e.g., “I was married to the love of my life and could not have been happier”; “My relationship with my family was much more stable”). Moreover, participants also engaged in more positive and meaningful activities (that were not gambling) in their past (Constituent 3), which largely consisted of hobbies and other recreational activities (e.g., “I liked to go fishing and hunting”; “I spent more time doing leisure activities instead of figuring out everything I wanted to do to gamble”). In addition to enjoying a better quality of life, participants in Cluster I also described themselves as being a better person before they began gambling problematically (Constituent 4). These judgments of character often comprised their own disposition (e.g., “I was a person full of life”; “I was a very sweet person”) and their values (e.g., “I was a pretty transparent, honest person”). In sum, participants in this cluster reported a significant change (for the worse) in the quality of their life after gambling became problematic, and wrote about their past fondly, claiming specific aspects of their life and their character as being more favourable.

**Cluster II.** Participants in the second cluster ( $n = 11$ ) painted a less positive picture of their past. Their comments suggested that life was already quite hard before they started gambling problematically (Constituent 7), referring to both the difficult times they faced (e.g., “I seldom found myself outside of the house with little friends”) and their general dissatisfaction with life (e.g., “Before it got bad I was so bored with life”). These difficult times may have triggered the onset of their problem gambling (Constituent 8), with traumatic moments typically involving the death of a loved one

(e.g., “In the year before I started, two of my siblings committed suicide”; “What broke the camel’s back was when I lost my uncle”). Likely because participants reported that their life was already quite difficult before their gambling became problematic, they also mentioned that the quality of their life did not change once they started gambling problematically (Constituent 6). That is, participants didn’t see gambling as having made their life any worse than it already was (e.g., “My life was (and still is) quite uninteresting”; “My life was already very hard before I started gambling”). Rather, some people see their gambling as having added something to their hard life, expressing that they are unwilling to change their gambling behaviour (Constituent 9). These people often framed gambling in a positive light while ignoring the potential harms (e.g., “It’s a rush I can’t describe”; “Gambling really just creates a little bit of excitement”) or provided their motive for continued play (e.g., “I am trying to win enough money to leave this horribly boring area”; “They say you cannot win if you do not play”). In sum, participants in this cluster described a past that was already quite difficult to begin with, and that gambling may have added an element of excitement to this difficult life.

**Past Perception Ratings.** To compare the two clusters further, a series of one-way ANOVAs were conducted on seven face-valid items assessing participants’ perceptions of their past before problem gambling. As indicated in Table 3, there were no significant differences between clusters on how vivid or vague their past before problematic gambling was in their mind. There were also no cluster differences in participants’ ratings of how anxious it makes them feel to think about the life they lived without gambling. However, participants in Cluster I ( $M = 5.60$ ,  $SD = 1.23$ ) expressed greater longing for their past than those in Cluster II ( $M = 3.27$ ,  $SD = 1.90$ ),  $F(1, 29) = 17.15$ ,  $p < .001$ ). Moreover, participants in Cluster I ( $M = 5.95$ ,  $SD = 1.00$ ) also reported

that they felt significantly more safe and secure in their life before gambling than did those in Cluster II ( $M = 3.55$ ,  $SD = 1.86$ ),  $F(1, 29) = 22.17$ ,  $p < .001$ ). Participants in Cluster I ( $M = 5.65$ ,  $SD = 1.04$ ) also reported that their life before gambling became problematic was more full of meaning than did participants in Cluster II ( $M = 3.27$ ,  $SD = 1.90$ ),  $F(1, 29) = 20.50$ ,  $p < .001$ ). Lastly, participants in Cluster I ( $M = 5.80$ ,  $SD = 1.06$ ) indicated that they also felt significantly more love in their life than did participants in Cluster II ( $M = 3.18$ ,  $SD = 1.78$ ),  $F(1, 29) = 26.70$ ,  $p < .001$ ).

**Behaviour Change Measures.** All participants were asked to rate the extent to which they felt ready to change their gambling behaviour, in addition to the extent to which they desired change. Participants were also asked whether they had made a previous attempt to change their gambling behaviour. Results indicated that participants in Cluster I ( $M = 7.15$ ,  $SD = 1.60$ ) reported a significantly greater readiness to change their gambling behaviour than did participants in Cluster II ( $M = 4.64$ ,  $SD = 2.50$ ),  $F(1, 29) = 11.71$ ,  $p = .002$ . Participants in Cluster I ( $M = 6.85$ ,  $SD = 1.66$ ) also reported a significantly greater desire to change their gambling behaviour than did participants in Cluster II ( $M = 5.00$ ,  $SD = 2.76$ ),  $F(1, 29) = 5.48$ ,  $p = .03$ . However, there were no cluster differences in the likelihood a previous attempt to change their gambling behaviour had been made,  $\chi^2(1) = .13$ ,  $p = .72$ .

### **Future Condition**

The characteristic attributes of each cluster, along with the non-differentiating characteristics, are summarized in Table 4. Excerpts from narratives whose profiles most nearly resembled the ideal type for each cluster are also presented in the summary descriptions that follow.

**Cluster I.** Participants in the first cluster ( $n = 11$ ) anticipated that their future will be more positive than their current situation. Within this positive future, participants reported that they expect to experience more positive emotions when their gambling is no longer problematic (Constituent 1). That is, participants reported that they will be happier (e.g., “I think I would be much happier; “I will feel much more calm”) and avoid negative emotions, such as anxiety (e.g., “I will be patient and avoid anxiety”; My emotions will be much more stable”). Participants also described specific aspects of their life that they anticipate as being more favourable when their gambling is no longer problematic, such as their financial situation (Constituent 2). While suggesting that they would have more money in general (e.g., “I’d definitely have a lot of disposable income”; “I would have more money saved”), participants also mentioned that they can divert the money they spend on gambling into other productive areas, such as investment (e.g., “The amount being spent on gambling can be saved for a much more better form of investment”; “I could invest that money in retirement”). They also reported that they plan on engaging in more meaningful activities when their gambling is no longer a concern (Constituent 3), such as pursuing hobbies and travel (e.g., “I would have more time to read, cook, live my life”; “I would want to go on vacation and visit places”) or engaging in more productive activities (e.g., “I will...do things that are positive to [myself] like readings books and journals, doing some exercise”; “I will have much more time focusing on immediate and future goals”). In sum, participants in this cluster reported being optimistic about a future in which they will have more money, engage in more positive activities, and by doing so, be happier in life.

**Cluster II.** Participants in the second cluster ( $n = 15$ ) described a future with more ambivalence (Constituent 4). That is, while quitting gambling itself was described

as being a positive change, they anticipated that other aspects of their life will either stay the same (e.g., “I don’t know exactly how much would change”; “My life would pretty much [stay] the same”) or worsen (e.g., “I think I would feel like something is missing in my life...I’m worried that I would feel bored all the time”; “I would be a bit less fun and less driven”). This ambivalence extended toward thoughts of changing their gambling behaviour, with participants expressing a resistance to change (Constituent 5). Though participants acknowledged that change was in their best interest, participants largely commented on how difficult change will be (e.g., “My life would be a lot better if I change my gambling, but I don’t think I can stop”; “I think it would be very hard...I wish I could quit”) as well as how frustrated they were with their current situation (e.g., “It is frustrating and I feel like a failure in life, but there’s not much I can do”; “It’s not like I haven’t thought about this before or tried stopping”). In sum, while participants in this cluster envisioned a future where changing their gambling behaviour will be rewarding, they also understand that hardships will arise when overcoming their current situation.

**Future Perception Ratings.** To compare the two clusters further, a series of one-way ANOVAs were conducted on seven face-valid items assessing participants’ perceptions of their future when their gambling is no longer problematic. These face-valid items are identical to the past perception items but were adapted for the future. As indicated in Table 5, there were no significant differences between clusters in participants’ ratings of how anxious it makes them feel to think about the life they will live without gambling. However, participants in Cluster I ( $M = 6.00$ ,  $SD = 0.78$ ) reported that the life they would live after their gambling is no longer problematic is significantly more vivid in their mind than did those in Cluster II ( $M = 4.47$ ,  $SD = 1.46$ ),  $F(1, 24) = 10.02$ ,  $p = .004$ , and significantly less vague ( $M = 2.45$ ,  $SD = 1.67$ ) compared to those in

Cluster II ( $M = 4.27$ ,  $SD = 2.09$ ),  $F(1, 24) = 5.58$ ,  $p = .03$ . Moreover, participants in Cluster I ( $M = 6.09$ ,  $SD = 1.22$ ) expressed greater longing for the life they would live without gambling than did those in Cluster II ( $M = 4.47$ ,  $SD = 1.69$ ),  $F(1, 24) = 7.35$ ,  $p = .01$ . Participants in Cluster I ( $M = 6.09$ ,  $SD = 0.83$ ) also reported that they will feel significantly more safe and secure in their life without gambling than will participants in Cluster II ( $M = 4.67$ ,  $SD = 1.72$ ),  $F(1, 24) = 6.402$ ,  $p = .02$ . Participants in Cluster I ( $M = 6.27$ ,  $SD = 0.91$ ) also reported that their life without gambling will be significantly more full of meaning than did participants in Cluster II ( $M = 5.33$ ,  $SD = 1.18$ ),  $F(1, 24) = 4.89$ ,  $p = .04$ . Lastly, participants in Cluster I ( $M = 5.82$ ,  $SD = 1.25$ ) indicated that they will feel more love in their life than will participants in Cluster II ( $M = 4.53$ ,  $SD = 1.73$ ),  $F(1, 24) = 4.38$ ,  $p = .05$ .

**Behaviour Change Measures.** All participants were asked to rate the extent to which they felt ready to change their gambling behaviour, in addition to the extent to which they desired change. Participants were also asked whether they had made a previous attempt to change their gambling behaviour. Results indicated that participants in Cluster I ( $M = 7.27$ ,  $SD = 2.15$ ) did not differ from participants in Cluster II ( $M = 6.40$ ,  $SD = 2.44$ ) in the extent to which they were ready to change their gambling behaviour,  $F(1, 24) = 0.89$ ,  $p = .35$ . However, participants in Cluster I ( $M = 6.91$ ,  $SD = 2.17$ ) reported a significantly greater desire to change their gambling behaviour than did participants in Cluster II ( $M = 5.27$ ,  $SD = 1.71$ ),  $F(1, 24) = 4.68$ ,  $p = .04$ . Lastly, there were no cluster differences in the likelihood that a previous attempt to change their gambling behaviour had been made,  $X^2(1) = .54$ ,  $p = .46$ .

## Discussion

The aim of the Study 1 was to learn about how participants describe their life before gambling became problematic, as well as their anticipated future when their gambling is no longer problematic. To this end, I classified concrete experiential accounts of the past as well as the future provided by problem gamblers. Doing so allowed for the possibility that there is more than one qualitatively distinct lived past experience or anticipated future experience. Results from the current study help to articulate the shared meaning that people give to their past lived experiences and the future they envision for themselves without problem gambling and how this relates to readiness to change.

There were two different ways that gamblers wrote about their past experiences. The first (and most common) way to describe their past was general positivity. Specifically, people placed their past before gambling in an idealistic light, emphasizing the quality of their character, their relationships, and the array of meaningful activities they participated in. These gamblers contrasted their favourable past against the hardships they currently face as a result of their gambling and reported a longing to return to their past before gambling. This clustering of these constituents suggests that gamblers with a positive past may experience nostalgia as a result of the discontinuity that their problematic gambling behaviour caused (Kim & Wohl, 2015; Salmon et al., 2018; Sedikides et al., 2015; Wohl et al., 2018). Gamblers with a positive past also reported both a greater readiness and desire to change their gambling behaviour than did gamblers with a difficult past. Therefore, a past focus that elicits nostalgia may have the greatest behaviour change utility among gamblers who have a positive past they desire to reclaim.

A second way that gamblers wrote about their past was of a life that was already quite difficult before gambling became problematic. The negative aspects of their past

experiences involved periods of boredom or general dissatisfaction, as well as traumatic events that served as a trigger for the onset of their gambling. People who described such difficulties in their past also expressed (an unprompted) unwillingness to change their gambling behaviour. In line with participants' experiential narratives, gambling is often used as a maladaptive coping method to distract oneself from having to deal with the problems in their life (Gupta et al., 2004; Nower et al., 2004). In addition, gambling can also fill the void in one's life, typically through alleviating boredom (Wood & Griffiths, 2007). Coupled with the lower self-reported readiness to change when compared to those who wrote about a positive past, a difficult past may undermine the behaviour change utility of a past focus (Blaszczynski & Nower, 2002; Stewart & Zack, 2008).

There were also two different ways that gamblers envisioned their future. The first way to describe their future was overwhelmingly positive. Specifically, people wrote optimistically about their possible future without problematic gambling, emphasizing a better financial situation and, as a result, they will be able to engage in more meaningful activities and ultimately be happier. They also reported that this optimistic future is vivid in their mind. These findings are in line with prior research suggesting that optimism is associated with the ability to generate vivid mental imagery of positive future events (Blackwell et al., 2013; Ji et al., 2017). Importantly, gamblers who anticipated a positive future also reported that they long for this future in which they are free from gambling problems, and reported a greater desire to change their gambling behaviour than did gamblers who were ambivalent about their future. Therefore, a future focus that elicits longing for a better possible future may have the greatest behaviour change utility among gamblers who are optimistic about the future they want to attain.

The second way that gamblers described their future was with ambivalence. Although participants were asked to envision a life when their gambling was no longer problematic, the hardships described in participants' narratives were often centred on the process of quitting gambling or the uncertainty associated with what life may look like without gambling. Indeed, gamblers with ambivalence about their future reported that their future is hard to envision. This may be due to the skewed temporal orientation commonly reported by problem gamblers (Toneatto, 1999) in which their shorter time horizons prevent them from predicting events far into their future (Hodgins & Engel, 2002). Gamblers who were ambivalent about their future also reported lower desire to change their gambling behaviour compared to those who were optimistic about the future, suggesting that ambivalence represents a significant limit to the behaviour change utility of a future focus.

Importantly, there were a couple of constituents that did not differentiate between the two clusters for both the past condition (see Constituents 10 to 12 in Table 2) and the future condition (see Constituents 6 to 12 in Table 4). There was no difference in the proportion of participants in each cluster in the past condition who mentioned that their financial situation was better before gambling became problematic (Constituent 11, Table 2). Rather, this constituent was endorsed highly in both clusters. Because problem gambling is associated with significant financial loss regardless of one's past experiences (Ladouceur et al., 1994), it is unsurprising that gamblers in both clusters would report that their financial situation was better before their gambling became problematic. Similarly, in the future condition, there were no differences in the proportion of participants in each cluster who emphasized that they will be more socially connected in the future (Constituent 6, Table 4). In fact, the number of people expressing this desire

was rather high. This high level of endorsement suggests that regardless of how people feel about the future, most gamblers expect that they will be better able to form and maintain positive, meaningful relationships once their gambling is no longer interfering with their interpersonal relationships (Cowlshaw et al., 2016). Thus, although there are fundamental differences between clusters, there are also common features that contribute to our understanding of gamblers' lived and anticipated experiences.

Taken together, the results of this numerically aided phenomenological study suggest that a specific temporal focus may be a source of motivation for self-directed change, but only when that temporal dimension is perceived to be positive. Specifically, gamblers who wrote about a positive past and reported greater longing for this time in life as well as greater readiness to change compared to those who reported that their past before gambling was difficult. Similarly, gamblers who wrote optimistically about a future without gambling also reported greater longing for this desired future as well as a greater desire for change compared to those who felt ambivalent about the future. In this light, a difficult past and an ambivalent future represent significant limits to a past and future focus in motivating self-directed change.

The results of the current study also informed subsequent measures of temporal perceptions. Specifically, measures for perceptions of the pre-addicted past were developed to assess the extent to which gamblers perceive their past before gambling as being positive or difficult. Measures for perceptions of a future once gambling is no longer problematic were developed to assess the extent to which gamblers perceive their future without gambling optimistically or ambivalently. Therefore, the dimensions of the past and future focus used herein were directly informed by the results of the qualitative analysis.

### **Study 2: A Correlational Assessment**

The purpose of Study 2 was to replicate and extend the results of Study 1 by conducting a (high powered) quantitative assessment of problem gamblers' perceptions of both their past before gambling and future without gambling. As shown in Study 1, any such assessment must take into account variation in lived experience (i.e., not all gamblers look fondly upon their past) as well as variation in anticipated future experiences (i.e., not all gamblers look forward to a future without gambling). Multi-item measures of the variables of interest were used in Study 2 to allow for a more reliable assessment of how gamblers perceive their past before gambling and future without gambling.

Additionally, I examined the processes by which a past and future focus are associated with readiness to change. In Study 1, longing for the pre-addicted past was elevated among participants who wrote about a positive past, and longing for a future without gambling was elevated among participants who wrote about a positive anticipated future. Therefore, I employed a correlational design to test the associations between problem gamblers' lived experiences (i.e., positive versus difficult past), anticipated future experiences (i.e., optimistic versus ambivalent about the future), readiness to change, as well as the processes (i.e., nostalgic or future longing) by which these associations may occur.

In the current study, I tested the predictive utility of two mediation models. For the first mediation model, I assessed whether participants who perceive their past as being more positive than difficult will report greater feelings of nostalgia for their pre-addicted past, which will in turn be associated with higher readiness to change. For the second mediation model, I tested whether participants who perceive their future more

optimistically than ambivalently will report greater readiness to change to the extent that they feel longing for this better possible future.

All hypotheses were registered on Open Science Framework (OSF) prior to data collection<sup>1</sup>: [https://osf.io/wyvbt/?view\\_only=09a699e9a7554676b8610602276e0aa7](https://osf.io/wyvbt/?view_only=09a699e9a7554676b8610602276e0aa7).

## Method

### Participants

A community sample of gamblers were recruited from Amazon's MTurk. Participation was limited to those who 1) were residents of the United States, 2) have spent at least \$100 on gambling activities (e.g., slot machines, poker, roulette, sports betting) in the past 12 months, 3) think they have a problem with their gambling (e.g., spend too much time or money gambling), and 4) were not in treatment for their gambling. Moreover, participation was further limited to those who reported at least one symptom of problem gambling using an adapted version of the NODS-CLiP (Toce-Gerstein et al., 2009). The purpose of screening participants was to ensure that enough problem gamblers (i.e., the target sample) were present in the study. Based on this inclusion criteria, I recruited 396 community gamblers (211 male, 181 female, 1 non-binary) who were not seeking treatment for their gambling problems. Participants' ages ranged from 19 to 79 years ( $M = 36.49$ ,  $SD = 10.12$ ).

The sample size for Study 2 was determined based on an a priori power analysis (Fritz & MacKinnon, 2007) which determined that approximately 350 participants were required to detect small-to-medium path coefficients with 80% power. I aimed to recruit an additional 50 participants to account for the possibility of poor data quality.

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<sup>1</sup> Pre-registered hypotheses differ from those outlined in the current study. The focus of this study was revised to simplify the model due to power considerations and to mirror analyses in both the past and future models.

At recruitment, participants were informed that they would earn \$1.00 for completing the study (approximately 20 minutes in duration). This compensation is in line with what is typically offered for participation in social psychological research on MTurk with a similar duration (Buhrmester et al., 2011; Sheehan, 2018). Of note, all eligible participants who provided their informed consent to participate in the study received remuneration regardless of study completion status.

Because the purpose of this study was to examine how problem gamblers think and feel about their past before gambling as well as their possible future without gambling, the sample used for analysis was further limited to only participants who exhibited moderate to high-risk gambling symptomatology. From the original sample of 396 participants, two participants were categorized as a “non-problem” gambler and three participants were categorized as a “low-risk” gambler according to the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001), and thus were excluded from analyses. Furthermore, 119 participants either provided nonsensical responses to the open-ended items (i.e., they did not follow the writing prompts) or did not provide a response and were excluded from the main analyses, 23 participants were excluded due to significant missing data on the variables of interest (i.e., more than 80% missingness), and 20 participants were excluded due to a failed attention check (i.e., they self-reported that the data they provided were inaccurate).

The final sample for Study 2 consisted of 229 moderate and high-risk gamblers (109 men, 119 women, 1 non-binary), ranging in age from 20 to 79 years ( $M = 35.61$ ,  $SD = 10.60$ ). Of the final sample, 28 were categorized as moderate-risk gamblers (12.2%), and 201 were categorized as high-risk gamblers (87.8%). A total of 43 participants also reported gambling more than once a day (18.8%), 123 gambled more than once a week

(53.7%), 54 gambled more than once a month (23.6%), eight gambled more than once every three months (3.5%), and one reported gambling less than once every three months (0.4%).

### **Procedure**

A recruitment notice (Appendix H) 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 (Appendix I), explaining the nature of the study. As is recommended by Hauser and colleagues (2018), only partial eligibility criteria were presented in the recruitment notice and informed consent to prevent participants from self-selecting into the study. Potential participants were thus informed that they must be a resident of the United States, and that they must have spent \$100 on gambling activities in the past 12 months to be eligible to participate. However, potential participants were also informed that they would be assessed on additional eligibility criteria not explicitly stated in the recruitment notice. After consenting to the study, participants were presented with full set of eligibility items, in which they first confirmed that they were a resident of the United States and had spent \$100 on gambling activities in the past 12 months. Participants then confirmed the remaining eligibility criteria, which required that they 1) had not recently quit gambling (i.e., in the last three months), 2) had not previously sought treatment or were not currently seeking treatment for their gambling problems, 3) reported at least one problem gambling symptom according to the NoDS-CLiP (Toce-Gerstein et al., 2009), and 4) self-reported that they had a gambling problem (i.e., “Do you think you have a gambling problem?”). Participants who failed the

eligibility criteria were re-directed to an ineligibility script (Appendix J) and were unable to continue with the survey.

Eligible participants continued to the full survey (see Appendix K). They completed measures assessing demographics and gambling behaviour and a series of measures about their past before gambling and their future without gambling. Past-focused measures included primary variables of interest: positive and negative perceptions of the pre-addicted past, nostalgia for the pre-addicted past; as well as a series of exploratory variables: self-discontinuity, negative life events, emotions associated with the pre-addicted past, and clarity of the past. Future-focused measures included primary variables of interest: optimistic and ambivalent perceptions of a future without gambling, longing for the future; as well as a series of exploratory variables: anticipated future self-discontinuity, emotions associated with a future without gambling, and clarity of the future. Additional exploratory measures in the current study included an open-ended item about experiences with gambling (i.e., when participants realized gambling may be a problem), as well as a measure of gambling motives. Lastly, participants completed a measure of readiness to change and were assessed on their problem gambling symptomatology. After completing the survey, participants were then fully debriefed (Appendix L) and compensated for their time.

Importantly, the block of measures pertaining to the past before gambling and the block of measures pertaining to the future without gambling were counterbalanced for all participants. Specifically, half of participants were randomly assigned to first complete the series of past-focused measures before completing future-focused measures, whereas the other half first completed the series of future-focused measures before completing

past-focused measures. The purpose of counterbalancing these measures was to avoid potentially confounding the results by introducing order effects.

This research was reviewed and cleared by the Carleton University Research Ethics Board-B (CUREB-B Reference #108822).

### **Measured Variables**

**Perceptions of the Past.** Positive and negative perceptions of the pre-addicted past were assessed with a six-item continuous measure adapted from the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999). While the original ZTPI consists of 56 items across five subscales (i.e., past-negative, past-positive, present-hedonistic, present-fatalistic, future), the six items selected for this measure were adapted from the three items with the highest factor loadings for the past-negative and past-positive subscales according to Zimbardo and Boyd's (1999) original paper. Items were then revised to focus on life before the participant's gambling became problematic, while also incorporating themes found in Study 1. Therefore, three items measured positive perceptions of the pre-addicted past ("On balance, there is much more good to recall about my life before gambling became problematic than bad," "Positive memories of the life I lived before gambling can readily spring to mind," and "Overall, I would say my life before problem gambling was positive"), and three items measured negative perceptions of the pre-addicted past ("Even before my gambling became problematic, I was unsatisfied with my life," "Even before my gambling became problematic, my life was rather difficult," and "I experienced significant life hardships even before I began gambling problematically"). Each item was anchored at 1 (*I disagree a lot*) and 5 (*I agree a lot*). The items in both the positive past subscale ( $\alpha = .69$ ) and the negative past subscale ( $\alpha = .79$ ) demonstrated good internal reliability. Participants' scores were

calculated by obtaining a mean score of the three items in each subscale. A final composite variable was then created by subtracting participants' mean scores on the negative past subscale from mean scores on the positive past subscale, where positive composite scores indicated that perceptions of the pre-addicted past were more positive than negative, and negative composite scores indicated that perceptions of the pre-addicted past were more negative than positive.

**Nostalgia.** Nostalgic reverie for the pre-addicted self was assessed using a five-item continuous measure (Kim & Wohl, 2015). Items consisted of: "I am already feeling quite nostalgic about my life before my gambling became problematic," "Now that I have started gambling problematically, I miss my previous lifestyle," "Before I started gambling problematically, I was a better person than I am today," "I like the person I was before I started gambling problematically better than the person that I am now," and a reverse-coded item, "I do not long for my life before my gambling became problematic." Each item was anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). While the five items demonstrated moderate internal reliability ( $\alpha = .66$ ), the reverse-coded item was removed to further enhance reliability ( $\alpha = .87$ ), creating a four-item scale. Participants' scores were then calculated by obtaining the mean of the final four items.

**Perceptions of the Future.** Optimistic and ambivalent perceptions of the future without gambling were assessed with an eight-item continuous measure adapted from the Life Orientation Test – Revised (LOT-R; Scheier et al., 1994). Items were adapted to include an ambivalent component (based on findings from Study 1) and were further revised to focus on life after the participant's gambling is no longer problematic. Four items assessed optimistic perceptions of a future without gambling ("I expect my life to go well for me after I quit or cut down on gambling," "The life I will live after quitting or

cutting down on gambling will generally be positive,” “I am optimistic about my future after quitting or cutting down on gambling,” and “I am confident life will be better after I quit or cut down on gambling”), and four items also assessed ambivalent perceptions of a future without gambling (“A future without gambling will be both good and bad,” “Overall, I expect both good and bad things to happen when I quit or cut down on gambling,” “I am unsure of how my life will go after I quit or cut down on gambling,” and “If I quit or cut down on gambling, the quality of my life could be better, but also could be worse”). Each item was anchored at 1 (*I disagree a lot*) and 5 (*I agree a lot*). The items in both the optimistic future subscale ( $\alpha = .87$ ) and the ambivalent future subscale ( $\alpha = .65$ ) demonstrated moderate to good internal reliability. Participants’ scores were calculated by obtaining the mean of the four items in each subscale. A final composite variable was then created by subtracting participants’ mean scores on the ambivalent future subscale from mean scores on the optimistic future subscale, where positive composite scores indicated that perceptions of the future without gambling were more optimistic than ambivalent, and negative composite scores indicated that perceptions of the future without gambling were more ambivalent than optimistic.

**Longing for the Future.** Longing for a future without gambling was assessed using a five-item continuous measure (adapted from Kim & Wohl, 2015). Items consisted of: “I am already looking forward to the life I will live after I quit or cut down on gambling,” “I yearn for a life free of gambling problems,” “I will like the person I will be after I quit or cut down on gambling better than the person I am today,” “The person I will be when I am no longer gambling problematically will be better than the person I am today,” and a reverse-coded item, “I do not long for how my life will be without problem gambling.” Each item as anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). While

the five items demonstrated moderate internal reliability ( $\alpha = .65$ ), the reverse-coded item was removed to further enhance reliability ( $\alpha = .87$ ) to create a four-item scale.

Participants' scores were then calculated by obtaining the mean of the final four items.

**Readiness to Change.** Akin to Study 1, readiness to change was assessed using the Biener and Abrams' (1991) single-item pictorial contemplation ladder adapted for problem gambling. 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*). Following the contemplation ladder, participants also expressed their desire to change their gambling on a single face-valid item with scale responses anchored at 0 (*no desire*) and 9 (*full desire*).

**Problem Gambling Symptomatology.** Akin to Study 1, problem gambling symptomatology was assessed using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The PGSI is a continuous nine-item measure ( $\alpha = .84$ ) that assesses problem gambling behaviour along with the consequences of problem gambling. Responses were 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 as non-problem gamblers, low-risk gamblers, moderate-risk gamblers, or high-risk gamblers (see Study 1 Procedure and Measured Variables for more detail).

## Results

### Preliminary Analyses

To ensure proper assumptions were met for the multiple regression analyses, the data were screened for linearity, multivariate normality, heteroscedasticity, multivariate outliers, and multicollinearity. Of note, data were collected independently with no known temporal connection, providing support for the independence of observations assumption.

**Linearity.** Visual inspection of scatterplots between each independent variable (i.e., perceptions of the past, nostalgia, perceptions of the future, longing for the future) against the dependent variable (i.e., readiness to change) all demonstrated linear associations. Therefore, the assumption of linearity was met.

**Multivariate Normality.** To test for multivariate normality in each model, Mardia's test for multivariate skewness and kurtosis (Cain et al., 2017) was calculated among the variables of interest in the past-focused model (i.e., perceptions of the past, nostalgia, readiness to change), as well as among those in the future-focused model (i.e., perceptions of the future, longing for the future, readiness to change). Results revealed significant multivariate skewness,  $b = 1.43, z = 54.36, p < .001$ , and significant multivariate kurtosis,  $b = 16.54, z = 2.13, p = .03$  among the past-focused model variables. Among the future-focused model variables, Mardia's test also revealed significant multivariate skewness,  $b = 1.39, z = 52.88, p < .001$ , and multivariate kurtosis,  $b = 17.15, z = 2.97, p = 0.002$ . As the assumption of normality was violated, both mediation models used bias-corrected bootstrapping for the confidence intervals (Preacher & Hayes, 2004).

**Heteroscedasticity.** To test for heteroscedasticity among the variables of interest, two Breusch-Pagan and Koenker tests (Daryanto, 2020) were conducted for the past-focused mediation model and the future-focused mediation model, both in which readiness to change was the dependent variable. Homoscedasticity assumes that variation in the residuals is evenly distributed at each point of the predictor variables. However, both models violated the assumption of homoscedasticity, meaning that variance in residuals was dependent on values of the independent variables in both the past-focused mediation model ( $\chi^2(1) = 10.12, p = .006$ ) and the future-focused mediation model ( $\chi^2(1)$

= 12.57,  $p = .002$ ). As such, heteroscedastic-consistent bootstrapping was used for the main analyses (Davidson & MacKinnon, 1993).

**Multivariate Outliers.** To examine for possible cases of multivariate outliers, two multiple linear regressions were performed. In one regression model, readiness to change was the dependent variable and perceptions of the past and nostalgia were the predictor variables. In the second regression model, readiness to change was the dependent variable and perceptions of the future and longing for the future were the predictor variables. Mahalanobis Distance statistics were then saved for examination. 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, two multivariate outliers were identified ( $MD_1 = 18.39, p = .0001$ ;  $MD_2 = 14.35, p = .0008$ ) in the past-focused regression model, and no multivariate outliers were identified in the future-focused regression model. To determine impact, the past-focused mediation analysis was run with and without the multivariate outliers. The removal of the outliers had little to no impact—there was no change in the direction or the significance of the direct and indirect effects. Thus, to retain the maximum number of cases possible for power considerations, the outlier was retained for the main analyses.

**Multicollinearity.** To test for multicollinearity, correlation coefficients were calculated between the variables of interest. Multicollinearity was not a concern as the largest correlation coefficient observed between predictor variables was between nostalgia and longing for the future,  $r(229) = .61, p < .001$ , which is below the recommended cut-off value of  $r = .80$ . (Cohen et al, 2003).

### Main Analyses

Table 6 contains the means, standard deviations, and correlation coefficients between the variables of interest.

Two hypothesized mediation models of readiness to change were assessed using PROCESS Model 4 (Hayes, 2017; version 4.0) in SPSS version 28. 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. Furthermore, bootstrapping was performed with heteroscedastic-consistent (HC) inferences to account for the presence of multivariate heteroscedasticity in both models using Davidson & MacKinnon's (1993) inference approach (i.e., HC3). The HC3 inference approach is recommended as it minimizes potential bias in the standard errors of regression coefficients introduced by the presence of heteroscedasticity with minimal loss of power (Hayes & Cai, 2007).

**Past-Focused Mediation Model.** I first tested the hypothesized mediation model in which perceptions of one's pre-addicted past (the predictor variable) were associated with readiness to change (the outcome variable) via nostalgia for the pre-addicted self (the mediating variable). The indirect effect was significant and positive ( $p < .05$ ),  $b = 0.08$ ,  $SE = 0.04$ , 95% CI [0.01, 0.16], providing support for the mediation model in which nostalgia mediates the relation between perceptions of the pre-addicted past and the extent to which gamblers are ready to change. Specifically, the more positive perceptions gamblers held toward their past, the more nostalgic they felt toward this past,  $b = 0.32$ ,  $se = 0.07$ , 95% CI [0.20, 0.45]. Greater feelings of nostalgia, in turn, were associated with higher levels of readiness to change,  $b = 0.24$ ,  $se = 0.11$ , 95% CI [0.02, 0.46] (see Figure

1 for direct and indirect effects). In total, the mediation model explained 12.00% of the variance in nostalgia and 5.09% of the variance in readiness to change.

**Future-Focused Mediation Model.** I then tested the second hypothesized mediation model in which perceptions of one's future after gambling (the predictor variable) were associated with readiness to change (the outcome variable) via longing for the future (the mediating variable). The indirect effect was significant and positive ( $p < .05$ ),  $b = 0.31$ ,  $SE = 0.09$ , 95% CI [0.14, 0.50], providing support for the mediation model in which longing for the future mediates the relation between perceptions of the future without gambling and the extent to which gamblers are ready to change. Specifically, the more optimistic gamblers felt toward their future, the more longing they felt for this future,  $b = 0.57$ ,  $se = 0.06$ , 95% CI [0.44, 0.69]. Greater feelings of longing for the future, in turn, were associated with higher levels of readiness to change,  $b = 0.54$ ,  $se = 0.15$ , 95% CI [0.24, 0.84] (see Figure 2 for direct and indirect effects). In total, the model explained 25.25% of the variance in future longing and 23.93% of the variance in readiness to change.

## Discussion

The aim of Study 2 was to quantitatively explore the conditions under which a past and future focus is positively associated with readiness to change. To this end, gamblers completed a series of measures on their perceptions of the past and future in relation to readiness to change. In doing so, I quantified preliminary insights gained from the qualitative assessment in Study 1 using a more powered approach. Moreover, the current study expanded upon previous findings by testing the processes by which a past focus and future focus are associated with motivation to quit or cut down on gambling behaviour. Specifically, I expected that longing for the pre-addicted past (i.e., nostalgia)

would mediate the association between perceptions of the past and readiness to change, and longing for a future without gambling would mediate the association between perceptions of the future and readiness to change.

Results from the current study provided support for both temporal hypotheses. That is, gamblers who reported that their past before gambling was more positive than difficult reported significantly higher levels of nostalgia for this pre-addicted past, which in turn was associated with greater readiness to change. These results directly extend findings from Study 1 in which gamblers with a positive past reported that they longed to return to this time in their life and were more ready for change compared to gamblers whose life was already quite difficult before they began gambling problematically. Specifically, I demonstrated that the association between a positive past focus and readiness to change can be explained, in part, by nostalgic longing. These findings are in line with previous work in which the content of nostalgia largely centres around positive past events (Routledge et al., 2008; Wildschut et al., 2006), as well as the association between nostalgia and approach motivation (see Sedikides & Wildschut, 2020). Thus, results support the notion that a past focus that elicits nostalgia has greater behaviour change utility among gamblers who have a positive past they desire to reclaim (Salmon & Wohl, 2020).

Similarly, Study 2 provided support for the hypothesized mediation model in which longing for a better possible future without gambling mediates the association between optimistic perceptions of the future and readiness to change. In other words, gamblers who felt more optimistic than ambivalent about their future once their gambling is no longer problematic reported significantly greater readiness to engage in behavioural change to the extent that they longed for this better possible future. The current study

expands on Study 1 by shedding further light onto the association between an optimistic future and readiness to change, as well as demonstrating that partial variance in this association is attributable to longing for the future. Having a positive outlook toward the future has been shown to be predictive of motivation to attain a specific goal (e.g., self-directed change), which may be strengthened among those who view changing their gambling behaviour as being instrumental to achieving this possible future (Van Calster et al., 1987). Therefore, results support previous research suggesting that a future focus may have greater behaviour change utility among gamblers whose possible future (once their gambling is no longer problematic) includes a desired outcome for the self (Markus & Nurius, 1986).

Although the current study demonstrated a significant and positive association between optimistic perceptions of the future and readiness to change, these findings differ slightly from those in Study 1. In Study 1, statistically similar levels of readiness to change were observed among those who wrote about an optimistic future and those who wrote about an ambivalent future. However, participants in Study 1 who felt optimistic about their future reported a greater desire for change compared to those who felt ambivalent, providing initial support for the motivating benefits of a future focus that were shown in Study 2. I contend that greater confidence should be placed in the results of Study 2 (compared to Study 1) due to the larger sample size and use of reliable measures.

Taken together, longing appears to be a central component of both a past and future focus. Indeed, both mediation models demonstrated an indirect effect whereby longing (i.e., nostalgic longing for the past, longing for a better possible future) mediates the association between temporal focus and readiness to change. These findings are in

line with the growing body of research on the significant motivational properties of nostalgia for behaviour change among people engaging in addictive behaviours (e.g., gambling, drinking; Kim & Wohl, 2015; Salmon et al., 2018; Wohl et al., 2018). A novel contribution of the current study is that longing for a better possible future appears to explain partial variance in the association between feeling optimistic about a future without gambling and being ready for change. Indeed, the emotional component of longing for this better possible future may be one such process by which a desired possible future engenders approach motivation (Oettingen, 2001).

The findings from Study 2 also provided insight into the limits and boundaries of a past and future focus. Perceiving the pre-addicted past as being more difficult than positive appears to undermine readiness to change via reduced nostalgia for this time. Likewise, feeling more ambivalent than optimistic about a future without gambling undermines readiness to change via reduced longing for this possible future. Therefore, gamblers who perceive their past or future to have negative elements may not readily draw on these temporal foci to ready themselves for change (Salmon & Wohl, 2020). Instead, it may be possible to manipulate temporal focus to change among gamblers with difficulties in their pre-addicted past or among those who feel ambivalent about a future without gambling to heighten longing and thus facilitate readiness to change.

### **Study 3: An Experimental Assessment of the Past Focus**

The purpose of Study 3 was to further investigate novel facilitators and barriers to readiness to change among a sample of problem gamblers. In Study 2, support was found for the hypothesized mediation model in which positive perceptions toward one's life before problematic gambling were positively associated with nostalgia for the pre-addicted past, which in turn was positively associated with readiness to change. In the

current study, I experimentally manipulated the valence of one's past (i.e., a positive past versus an ordinary past). In doing so, the limitations of the correlational assessment in Study 2 (i.e., directionality of the observed effects on longing is unknown) was addressed while providing an additional opportunity to provide further evidence for the behaviour change utility of a past focus. Importantly, the experimental nature of the current study also allowed for more controlled testing of the process by which a past focus elicits readiness to change (i.e., through nostalgia).

Findings from both Study 1 and Study 2 indicated that not all gamblers have a positive past to reflect upon, which can undermine readiness to change. Therefore, a secondary aim of the current study was to determine whether it is possible to make salient a positive past among problem gamblers, including those who report a difficult past before gambling. To this end, participants completed measures of positive and negative perceptions of their past before gambling before completing the manipulation. Including pre-test items allows for a higher degree of experimental control in accounting for potential variance in how pre-existing notions of one's past before gambling can facilitate or hinder readiness to change, and whether those who report difficulties in their life before gambling can benefit from a past focus.

Thus, in the current study, I tested whether people can be manipulated to find a positive past (controlling for their tendency to believe they have a positive past or not), and the downstream effects on readiness to change through longing for this positive past. I hypothesized that gamblers who are manipulated to find a positive past will feel nostalgic for that past relative to the control group (who were asked to think about an ordinary day in the past week). In turn, I expect that this heightened nostalgia will be associated with greater readiness to change.

All hypotheses were registered on Open Science Framework (OSF) prior to data collection. [https://osf.io/p786c/?view\\_only=3e8836aa778f496ea143822d90040b14](https://osf.io/p786c/?view_only=3e8836aa778f496ea143822d90040b14).

## **Method**

### **Participants**

A community sample of gamblers were recruited from Amazon's MTurk. As in Study 2, participation was limited to those who 1) were residents of the United States, 2) have spent at least \$100 on gambling activities (e.g., slot machines, poker, roulette, sports betting) in the past 12 months, 3) think they have a problem with their gambling (e.g., spend too much time or money gambling), and 4) were not in treatment for their gambling. To ensure enough problem gamblers were present in the current study, participation was again further limited to those who reported at least one symptom of problem gambling using an adapted version of the NODS-CLiP (Toce-Gerstein et al., 2009). Based on this inclusion criteria, I recruited 327 community gamblers (169 male, 154 female, 4 non-binary) who were not seeking treatment for their gambling problems. Participants' ages ranged from 19 to 80 years ( $M = 36.10$ ,  $SD = 10.93$ ).

The sample size for Study 3 was determined based on an a priori power analysis (Fritz & MacKinnon, 2007) which determined that approximately 350 participants were required to detect a small-to-medium effect with 80% power. I recruited an additional 50 participants to account for the possibility of poor data quality. Path estimates for the power analysis were informed by associations between the variables of interest in Study 2.

Participants each earned \$1.00 for their participation in the study (approximately 20 minutes in duration). This compensation is in line with what is typically offered for participation in social psychological research on MTurk with a similar duration

(Buhrmester et al., 2011; Sheehan, 2018). All eligible participants who provided their informed consent to participate in the study received remuneration regardless of study completion.

Because the purpose of this study was to examine how participants think and feel about their past before gambling became problematic, the sample used for analysis was further limited to only participants who exhibited moderate to problem gambling symptomatology. From the original sample of 327 participants, three participants were categorized as low-risk gamblers using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001), and thus were excluded from the analyses. Furthermore, 26 participants either provided nonsensical responses to the open-ended items (i.e., they did not follow the writing prompts) or did not provide a response and were excluded from the main analyses, 22 participants were excluded due to significant missing data on the variables of interest (i.e., more than 80% missingness), and three participants were excluded due to insufficient reCAPTCHA scores (i.e., less than .50; Qualtrics, 2022) as I was unable to confirm that these participants were not bots.

The final sample for Study 3 consisted of 273 moderate and high-risk gamblers (141 male, 128 female, 4 non-binary), ranging in age from 19 to 80 years ( $M = 36.13$ ,  $SD = 11.46$ ). Of the final sample, 18 were categorized as moderate-risk gamblers (6.6%), and 255 were categorized as high-risk gamblers (93.4%). A total of 55 participants also reported gambling more than once a day (20.1%), 156 gambled more than once a week (57.1%), 52 gambled more than once a month (19.0%), nine gambled more than once every three months (3.3%), and one reported gambling less than once every three months (0.4%).

**Procedure**

A recruitment notice (Appendix M) was posted on MTurk advertising the nature of the study. Upon agreeing to participate in the study, the MTurk recruitment notice linked participants to the online study hosted by Qualtrics. Participants were then be provided with the informed consent form (Appendix N) explaining the nature of the study. All consenting participants were then subjected to eligibility criteria (Appendix O) to confirm their problem gambling status. As in Study 2, potential participants were provided with select eligibility criteria and were informed that they would be assessed on additional eligibility criteria not mentioned in the recruitment notice. Hidden eligibility criteria is a best practice recommended by Hauser and colleagues (2018) to prevent participants from self-selecting into the study, with the goal of improving data quality. Participants who failed the full set of eligibility criteria were re-directed to an ineligibility script (Appendix P) and were unable to continue with the survey.

Eligible participants continued to the full survey (see Appendix Q), where they first completed demographics and gambling behaviour, an open-ended question asking about their experience with problem gambling, as well as pre-test items assessing pre-existing positive and negative perceptions of their past before gambling (as were included in Study 2). Participants were then presented with a brief preface asking them to “please read the instructions carefully and provide honest responses” before completing a series of writing tasks.

Participants were then randomly assigned to either the positive past condition (i.e., the experimental condition) or the ordinary past condition (i.e., the control condition). The manipulation was adapted from Wildschut et al. (2006) where participants were randomly assigned to either write about a nostalgic event or an ordinary

event. In the positive past condition, participants were instructed to reflect on a positive event from their life before gambling became problematic and write about it. In line with findings from Study 1 suggesting that not all gamblers readily have a positive past to draw upon, additional context was provided to facilitate the reflection process.

Specifically, participants were provided the following instructions:

“Regardless of what has happened in your life or how you have felt in your past when you were not gambling problematically, there are often positive moments in life where you have felt safe and secure. This could either be a brief moment or an extended period of time, or a person you felt safe with and loved by. We would like you to take some time to reflect on a positive event that captures this feeling. Please bring to mind this positive event from your life before gambling, think it through and briefly write about it below.”

In the ordinary past condition, participants were instructed to reflect on an ordinary event from the last week and write about it. To mirror instructions in the positive past condition, additional context was provided to facilitate the reflection process and participants were presented with the following instructions:

“Regardless of the ups and downs in your life, there are often numerous ordinary or mundane events that you have experienced. This could either be a brief moment or an extended period of time, or an ordinary interaction with another person. We would like you to take some time to reflect on one of these ordinary, mundane experiences. Please bring to mind this ordinary event that took place in the last week, think it through and briefly write about it below.”

In both conditions, participants were informed that a counter was placed on the page to encourage them take the necessary time to reflect. Participants were advised to

“be as vivid and descriptive as you can be.” Open-ended responses in each condition served as a manipulation check and attention check.

Following the manipulation, participants then completed measures assessing nostalgia, readiness to change, and problem gambling severity. After completing the survey, participants were then fully debriefed (Appendix R) and compensated for their time.

Additional variables were included in the current study for both exploratory purposes and to form the basis of an honours student’s thesis. These measures included optimistic and ambivalent perceptions of a future without gambling (adapted from Scheier et al., 1994), satisfaction with life (adapted from Diener et al., 1985), closeness to the past self (Baldwin, 2015), self-concept clarity (Campbell et al., 1996), and self-continuity (Sedikides et al., 2015). With the exception of perceptions of the future and one’s current satisfaction with life (which were included in the pre-test items), these exploratory variables were included at the end of the study as to not influence responses on the main variables of interest.

This research was reviewed and cleared by the Carleton University Research Ethics Board-B (CUREB-B Reference #108822).

### **Measured Variables**

**Perceptions of the Past.** Pre-existing positive and negative perceptions of the pre-addicted past were assessed with the same six-item continuous measure (adapted from Zimbardo & Boyd, 1999) used in Study 2. Three items assessed positive perceptions of the past (e.g., “On balance, there is much more good to recall about my life before gambling became problematic than bad”) and three items assessed negative perceptions of the past (e.g., “Even before my gambling became problematic, I was

unsatisfied with my life”). Each item was anchored at 1 (*I disagree a lot*) and 5 (*I agree a lot*). The three items in the positive past subscale ( $\alpha = .65$ ) demonstrated moderate internal reliability while the three items in the negative past subscale ( $\alpha = .83$ ) demonstrated good internal reliability. Participants’ scores were again calculated by obtaining a mean score of the three items in each subscale. A final composite variable was then created by subtracting participants’ mean scores on the negative past subscale from mean scores on the positive past subscale, where positive composite scores indicated that perceptions of the pre-addicted past were more positive than negative, and negative composite scores indicated that perceptions of the pre-addicted past were more negative than positive.

**Nostalgia.** Nostalgic reverie for the pre-addicted self was assessed using a five-item continuous measure (Kim & Wohl, 2015). Items consisted of: “I am already feeling quite nostalgic about my life before my gambling became problematic,” “Now that I have started gambling problematically, I miss my previous lifestyle,” “Before I started gambling problematically, I was a better person than I am today,” “I like the person I was before I started gambling problematically better than the person that I am now,” and the previously reverse-coded item in Study 2 was positively reworded to “I long for my life before my gambling became problematic.” Each item was anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Participants’ scores were calculated by obtaining the mean of the five items, which demonstrated good internal reliability ( $\alpha = .91$ ).

**Readiness to Change.** Akin to Studies 1 and 2, readiness to change was assessed using the Biener and Abrams’ (1991) single-item pictorial contemplation ladder adapted for problem gambling. 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*). Following the contemplation ladder, participants also expressed their desire to change their gambling on a single face-valid item with scale responses anchored at 0 (*no desire*) and 9 (*full desire*).

**Problem Gambling Symptomatology.** Akin to Studies 1 and 2, problem gambling symptomatology was assessed using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The PGSI is a continuous nine-item measure ( $\alpha = .86$ ) that assesses problem gambling behaviour along with the consequences of problem gambling. Responses were 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 as non-problem gamblers, low-risk gamblers, moderate-risk gamblers, or high-risk gamblers (see Study 1 Procedure and Measured Variables for more detail).

## Results

### Preliminary Analyses

A total of 133 (48.7%) participants were randomly assigned to the positive past (i.e., experimental) condition, while 140 (51.3%) participants were randomly assigned to the ordinary past (i.e., control) condition. To ensure there were no unanticipated differences between conditions, a one-way analysis of variance (ANOVA) was conducted on pre-manipulations measures and problem gambling severity. Importantly, participants did not differ between conditions on age,  $F(1, 268) = 0.08, p = .78$ , gender,  $\chi^2(2) = 0.01, p = .99$ , pre-existing positive and negative perceptions of their past before gambling,  $F(1, 271) = 0.28, p = .59$ , nor their problem gambling severity,  $F(1, 271) = 0.51, p = .48$ . Therefore, there were no differences in measured variables between conditions that were likely to influence the effectiveness of the manipulation.

To test whether the manipulation was successful, a one-way ANOVA was performed with manipulation condition as the independent variable (1 = positive past condition, 0 = ordinary past condition) and nostalgia as the dependent variable. Results suggested that participants in the positive past condition ( $M = 5.00$ ,  $SD = 1.31$ ) reported significantly higher levels of nostalgia compared to participants in the ordinary past condition ( $M = 4.55$ ,  $SD = 1.31$ ),  $F(1, 271) = 8.23$ ,  $p = .004$ . Therefore, the manipulation was effective in heightening nostalgia. However, the manipulation did not result in a direct effect on readiness to change,  $F(1, 271) = 0.03$ ,  $p = .86$ .

To ensure proper assumptions were met for the experimental regression analysis, the data were screened for linearity, multivariate normality, homogeneity of variances, multivariate outliers, and multicollinearity in each condition. Of note, data were collected independently with no known connection and participants were randomly assigned to each experimental condition, providing support for the independence of observations assumption.

**Linearity.** Visual inspection of scatterplots between the independent variable (i.e., nostalgia) and covariate (i.e., perceptions of the past) against the dependent variable (i.e., readiness to change) in each manipulation conditions demonstrated linear associations. Therefore, the assumption of linearity was met.

**Multivariate Normality.** To test for multivariate normality within each manipulation condition, Mardia's test for multivariate skewness and kurtosis (Cain et al., 2017) was conducted among the three dependent variables of interest (i.e., nostalgia, perceptions of the past, readiness to change). Results revealed significant multivariate skewness,  $b = 1.09$ ,  $z = 15.19$ ,  $p = .005$ , but not kurtosis,  $b = 15.46$ ,  $z = 0.49$ ,  $p = .62$ , in the ordinary past condition. In the positive past condition, Mardia's test also

demonstrated significant multivariate skewness,  $b = 1.53$ ,  $z = 33.73$ ,  $p < .001$ , but not kurtosis,  $b = 15.73$ ,  $z = 0.76$ ,  $p = .44$ . As the assumption of normality was violated, the main analysis used bias-corrected bootstrapping for the confidence intervals (Preacher & Hayes, 2004).

**Homogeneity of Variances.** To test for homogeneity of variances between manipulation conditions, Levene's test was conducted for the dependent measure of readiness to change, controlling for nostalgia and pre-existing perceptions of the past. Results suggested that the assumption of homogeneity of variances was met,  $F(1, 269) = 0.03$ ,  $p = .88$ . Therefore, equal variances can be assumed among dependent variables between manipulation conditions.

**Multivariate Outliers.** To examine for possible cases of multivariate outliers, a multiple linear regression was performed within each manipulation condition with readiness to change as the dependent variable and nostalgia and perceptions of the past as the independent variables. Mahalanobis Distance statistics were then saved for examination and significance values were calculated. No multivariate outliers were identified in the multiple regression model in both the ordinary past condition ( $MDs < 8.72$ ,  $ps > .01$ ) and the positive past condition ( $MDs < 9.45$ ,  $ps > .009$ ), thus all cases were retained.

**Multicollinearity.** To test for multicollinearity, correlation coefficients were calculated between the variables of interest in each manipulation condition. Multicollinearity was not a concern as the largest correlation coefficient observed between predictor variables in the positive past condition was between nostalgia and perceptions of the past,  $r(133) = .41$ ,  $p < .001$ , as well as in the ordinary past condition,  $r(140) = .41$ ,  $p < .001$ , which were both below the recommended cut-off value of  $r = .80$

(Cohen et al., 2003). See Table 8 for correlation coefficients between variables of interest.

### **Main Analyses**

Table 7 contains the means and standard deviations of the dependent measures in each condition. Table 8 contains the correlation coefficients between the variables of interest in each condition.

I tested the hypothesized experimental mediation model using PROCESS Model 4 (version 4.0) in SPSS version 28. The manipulation conditions were entered as the independent variable (1 = positive past condition, 0 = ordinary past condition), nostalgia as the mediating variable, readiness to change as the dependent variable, and the extent to which participants felt positively or negatively about their past before gambling (completed prior to the manipulation) was entered as a covariate. For the indirect effect, statistical significance was assessed using bootstrapped 95% bias-corrected confidence intervals with 5000 iterations (Preacher & Hayes, 2004) with HC3 inferences (Davidson & MacKinnon, 1993). Of note, HC3 inferences are appropriate for use when variances are deemed to be homogenous (Hayes & Cai, 2007).

Results from the experimental mediation analysis revealed a significant ( $p < .05$ ) and positive indirect effect,  $b = 0.17$ ,  $se = 0.08$ , 95% CI [0.04, 0.35], providing support for the hypothesis that nostalgia mediates the relation between an experimentally-induced positive past and the extent to which gamblers are ready to change their behaviour, while also controlling for their pre-existing perceptions of their past before gambling. Specifically, gamblers in the positive past condition reported feeling more nostalgic toward their pre-addicted past,  $b = 0.48$ ,  $se = 0.15$ , 95% CI [0.20, 0.78], which in turn was associated with greater readiness to change,  $b = 0.36$ ,  $se = 0.12$ , 95% CI [0.12, 0.60]

(see Figure 3 for direct and indirect effects). In total, the model explained 18.84% of the variance in nostalgia and 7.77% of the variance in readiness to change.

### **Discussion**

The aim of Study 3 was to experimentally test the processes by which perceptions of the pre-addicted past influence the extent to which problem gamblers are ready to change their behaviour. To this end, I manipulated the salience of a positive moment from gamblers' lives before their gambling became problematic among approximately half of participants, whereas the other half were manipulated to reflect on an ordinary event from the past week. Doing so allowed for an experimental assessment of the behaviour change utility of a (positive) past focus and the process by which this occurs.

Results from the current study demonstrated a significant direct effect of the manipulation on nostalgia for the pre-addicted past, but not readiness to change. Importantly, results revealed a significant indirect effect, providing support for the hypothesis that reflecting on a positive past before gambling became problematic facilitates greater readiness to change via nostalgia for the pre-addicted past, controlling for pre-existing perceptions of the past. That is, gamblers who reflected on a positive moment from their past before gambling became problematic (compared to those who reflected on an ordinary moment from the past week) reported significantly greater feelings of nostalgic longing for this pre-addicted past. These heightened feelings of nostalgia, in turn, facilitated higher levels of readiness to quit or cut down on gambling behaviour (Kim & Wohl, 2015; Wohl et al., 2018).

Of note, there was no direct effect of the positive past manipulation on readiness to change. That is, eliciting positive memories of the past alone may not be enough to motivate gamblers to take action to change their behaviour. Instead, reflecting on positive

moments from their past when they felt safe and secure can provide a concrete image of what can be reclaimed through behaviour change. However, the emotional component (i.e., nostalgia) is necessary for positive downstream effects on readiness to change. In line with Frederickson's (2001; 2004) broaden-and-build theory, positive emotions can heighten approach motivation for positive health behaviours. The current study demonstrates that the experience of positive emotions (i.e., nostalgia), when anchored to a desired outcome (i.e., positive moments in the pre-addicted past), enhances motivation to undertake a positive health behaviour (i.e., quitting or cutting down on gambling behaviour). To put a dark line under the matter, nostalgia is a necessary component of a past focus in motivating readiness to change.

I also controlled for the extent to which participants perceive that their past is more positive or more difficult than the present. Results showed that irrespective of how participants perceived their past, it is possible to make salient a positive time in one's life before gambling became problematic to harness the motivating power of nostalgia. This finding fills a significant gap in the behaviour change literature—a literature that has overlooked the valence of gamblers' past experiences when eliciting a past focus (Kim & Wohl, 2015; Salmon et al., 2018). Although difficulties in one's past can and do undermine readiness to change (Russell et al., 2021; Salmon & Wohl, 2020), there are often moments or people with whom people felt a sense of safety and security, if only briefly (Wohl & Salmon, 2016). By focusing on these positive moments in the past, it becomes possible to heighten nostalgic longing for a past that was free of addiction. Thus, eliciting a past focus is not exclusively beneficial to those who can readily draw on positive aspects of their pre-addicted past.

In sum, the findings from Study 3 replicate and extend the findings from Studies 1 and 2—studies that (qualitatively and quantitatively) demonstrated an association between a past focus and readiness to change. The current results also provide further empirical support for the process by which a positive past focus can facilitate readiness to change (i.e., through heightened nostalgia for the pre-addicted past). Although I was only able to compare a positive past to an ordinary past (i.e., not a negative past, which may have resulted in significantly greater differences to motivation), Study 3 showed that people can be guided to reflect on a positive moment in the pre-addicted past and that doing so yields increased willingness to engage in behaviour change by way of nostalgic reverie.

#### **Study 4: An Experimental Assessment of the Future Focus**

The purpose of Study 4 was to experimentally test the process by which a future focus leads to readiness to change among problem gamblers. In Study 2, support was found for the hypothesized mediation model in which optimistic perceptions toward one's life after gambling is no longer problematic was positively associated with readiness to change to the extent that gamblers longed for this better possible future. In Study 4, I attempted to replicate and extend the results from Study 2 by experimentally manipulating the valence of the future (i.e., a positive future versus an ordinary future). Moreover, Study 4 was designed to also further assess the process by which a future focus elicits readiness to change gambling behaviour.

Importantly, in both Studies 1 and 2, not all participants reported feeling optimistic about their future without gambling, which was negatively associated with readiness to change. Akin to Study 3, a secondary aim of Study 4 was to assess whether a positive future can be primed among problem gamblers, even among those who report

feeling ambivalent about their future. Specifically, participants completed a measure of optimistic and ambivalent perceptions of their future without gambling before completing the manipulation. Including such pre-test items allowed for a higher degree of experimental control by allowing me to account for potential variance in pre-existing perceptions of a future without gambling, and thus whether the manipulation can influence those who enter the study already ambivalent about a future without gambling.

I hypothesized that people can be manipulated to focus on a better possible future without gambling (controlling for their tendency to believe the extent to which they will have a positive future without gambling). Moreover, those who are manipulated to reflect on a better possible future will feel greater longing for this future without gambling relative to a control group (who were asked to think about an ordinary day in the next week). In turn, I expect that this heightened longing for the future will be associated with greater readiness to change.

All hypotheses were registered on Open Science Framework (OSF) prior to data collection. [https://osf.io/kmcba/?view\\_only=5dc41993732143c2bb817331794fe3a0](https://osf.io/kmcba/?view_only=5dc41993732143c2bb817331794fe3a0).

## **Method**

### **Participants**

A community sample of gamblers were recruited from Amazon's MTurk. Akin to previous studies, participation was limited to those who 1) were residents of the United States, 2) have spent at least \$100 on gambling activities (e.g., slot machines, poker, roulette, sports betting) in the past 12 months, 3) think they have a problem with their gambling (e.g., spend too much time or money gambling), and 4) were not in treatment for their gambling. Participation was further limited to those who reported at least one symptom of problem gambling using an adapted version of the NODS-CLiP (Toce-

Gerstein et al., 2009) to increase the likelihood of recruiting problem gamblers in the current study. Based on this inclusion criteria, I recruited 214 community gamblers (100 male, 113 female, 1 missing) who were not seeking treatment for their gambling problems. Participants' ages ranged from 19 to 66 years ( $M = 34.98$ ,  $SD = 10.35$ ).

The sample size for Study 4 was determined based on an a priori power analysis. It was determined that approximately 150 participants were required to detect a medium effect with 80% power. Fritz & MacKinnon's (2007) power table for mediation models was consulted based on path estimates obtained from Study 2. I aimed to recruit an additional 70 participants to account for the possibility of poor data quality.

Participants each earned \$1.00 for their participation in the study (approximately 15 minutes in duration). This compensation is in line with what is typically offered for participation in social psychological research on MTurk with a similar duration (Buhrmester et al., 2011; Sheehan, 2018). All eligible participants who provided their informed consent to participate in the study received remuneration regardless of study completion.

Because the purpose of this study was to examine how problem gamblers think and feel about their past before gambling became problematic, the sample used for analysis was further limited to only participants who exhibited moderate to high-risk gambling symptomatology. From the original sample of 214 participants, one participant was categorized as a non-problem gambler and two participants were categorized as low-risk gamblers according to the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001), and thus were excluded from the analyses. Furthermore, seven participants either provided nonsensical responses to the open-ended items (i.e., they did not follow the writing prompts) or did not provide a response and were excluded from the

main analyses, 27 participants were excluded due to significant missing data on the variables of interest (i.e., more than 80% missingness), one participant was excluded due to insufficient reCAPTCHA scores (i.e., unable to confirm participant was not a bot; Qualtrics, 2022), and two participants failed the attention checks and self-reported that the data they provided were not accurate resulting in exclusion.

The final sample for Study 3 consisted of 174 moderate and high-risk gamblers (84 male, 90 female), ranging in age from 19 to 66 years ( $M = 34.82$ ,  $SD = 10.19$ ). Of the final sample, 20 were categorized as moderate-risk gamblers (11.5%), and 154 were categorized as high-risk gamblers (88.5%). A total of 26 participants also reported gambling more than once a day (14.9%), 107 gambled more than once a week (61.5%), 32 gambled more than once a month (18.4%), eight gambled more than once every three months (4.6%), and one reported gambling less than once every three months (0.4%).

### **Procedure**

A recruitment notice (Appendix S) was posted on MTurk advertising the nature of the study. Upon agreeing to participate in the study, the MTurk recruitment notice linked participants to the online study hosted by Qualtrics. Participants were then be provided with the informed consent form (Appendix T) explaining the nature of the study. All consenting participants were then subjected to eligibility criteria (Appendix U) to confirm their problem gambling status. As in Studies 2 and 3, potential participants were provided with select eligibility criteria in the recruitment notice and were then assessed on additional eligibility criteria upon accessing the survey (see Hauser et al., 2018). Participants who failed the full set of eligibility criteria were re-directed to an ineligibility script (Appendix V) and were unable to continue with the survey.

Like Study 3, eligible participants continued to the full survey (see Appendix W), where they first completed demographics and gambling behaviour, an open-ended question asking about their experience with problem gambling, as well as pre-test items assessing pre-existing perceptions of their future without gambling (as were included in Study 2). Participants were then presented with a brief preface asking them to “please read the instructions carefully and provide honest responses” before completing the writing task.

Participants were then randomly assigned to either the positive future condition (i.e., the experimental condition) or the ordinary future condition (i.e., the control condition). To maintain continuity between experimental studies, the manipulation was adapted from Wildschut et al. (2006) akin to Study 3. In the positive future condition, participants were instructed to think about a positive aspect of their future without gambling and write about it. In line with findings from Study 1 suggesting that not all gamblers feel optimistic about a future without gambling, additional context was provided to facilitate the reflection process. Specifically, participants were provided the following instructions:

“Regardless of what will happen in your life or how you will feel in your future after you quit or cut down on gambling, there will often be positive aspects in life to look forward to. This could either be a positive feeling or an extended period of time, or an improved relationship with someone important to you. We would like you to take some time to write about a positive aspect of your future that captures this feeling. Please bring to mind this positive aspect of your future without gambling, think it through and briefly write about it below.”

In the ordinary future condition, participants were instructed to think about an ordinary aspect of their life that they expect will happen in the next week and write about it. To mirror instructions in the positive future condition, additional context was provided to facilitate the reflection process and participants were presented with the following instructions:

“Regardless of what will happen in your life or how you will feel in your future, there are often numerous ordinary or mundane aspects of life that you will experience. This could either be a brief moment or an extended period of time, or an ordinary interaction with another person. We would like you to take some time to write about this ordinary, mundane aspect of your life that you expect to happen in the next week. Please bring to mind this ordinary aspect of your life that you expect to happen in the next week, think it through and briefly write about it below.”

In both conditions, participants were informed that a counter was placed on the page to encourage them take the necessary time to think through the manipulation instructions. Participants were also advised to “be as vivid and descriptive as you can be.” Open-ended responses in each condition served as both a manipulation and attention check.

Following the manipulation, participants then completed measures assessing longing for the future, readiness to change, and problem gambling severity. After completing the survey, participants were fully debriefed (Appendix X) and compensated for their time.

Additional variables were included in the current study for exploratory purposes. These measures included perceptions of the past before gambling (adapted from

Zimbardo & Boyd, 1999), satisfaction with life (adapted from Diener et al., 1985), clarity of the future self (Van Gelder et al., 2015), self-concept clarity (Campbell et al., 1996), and self-continuity (Sedikides et al., 2015). These exploratory variables were included at the end of the study as to not influence responses on the main variables of interest.

This research was reviewed and cleared by the Carleton University Research Ethics Board-B (CUREB-B Reference #108822).

### **Measured Variables**

**Perceptions of the Future.** Optimistic and ambivalent perceptions of the future without gambling were assessed with the same eight-item continuous measure (adapted from Scheier et al., 1994) used in Study 2. Four items assessed optimistic perceptions of the future (e.g., “I expect my life to go well for me after I quit or cut down on gambling”) and three items assessed ambivalent perceptions of the future (e.g., “A future without gambling will be both good and bad”). Each item was anchored at 1 (*I disagree a lot*) and 5 (*I agree a lot*). The four items in the optimistic future subscale ( $\alpha = .85$ ) demonstrated good internal reliability and the four items in the ambivalent future subscale ( $\alpha = .61$ ) demonstrated moderate internal reliability. Participants’ scores were again calculated by obtaining the mean of the four items in each subscale. A final composite variable was then created by subtracting participants’ mean scores on the ambivalent future subscale from mean scores on the optimistic future subscale, where positive composite scores indicated that perceptions of the future without gambling were more optimistic than ambivalent, and negative composite scores indicated that perceptions of the future without gambling were more ambivalent than optimistic.

**Longing for the Future.** Longing for a future without gambling was assessed using a five-item continuous measure (adapted from Kim & Wohl, 2015). Items consisted

of: “I am already looking forward to the life I will live after I quit or cut down on gambling,” “I yearn for a life free of gambling problems,” “I will like the person I will be after I quit or cut down on gambling better than the person I am today,” “The person I will be when I am no longer gambling problematically will be better than the person I am today,” and the previously reverse-coded item was positively reworded to, “I long for how my life will be without problem 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, which demonstrated good internal reliability ( $\alpha = .91$ ).

**Readiness to Change.** Akin to previous studies, readiness to change was assessed using the Biener and Abrams’ (1991) single-item pictorial contemplation ladder adapted for problem gambling. 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*). Following the contemplation ladder, participants also expressed their desire to change their gambling on a single face-valid item with scale responses anchored at 0 (*no desire*) and 9 (*full desire*).

**Problem Gambling Symptomatology.** Akin to previous studies, problem gambling symptomatology was assessed using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The PGSI is a continuous nine-item measure ( $\alpha = .89$ ) that assesses problem gambling behaviour along with the consequences of problem gambling. Responses were 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 as non-problem gamblers, low-risk gamblers, moderate-risk gamblers, or high-risk gamblers (see Study 1 Procedure and Measured Variables for more detail).

## Results

### Preliminary Analyses

In the manipulation, 88 (50.6%) participants were randomly assigned to the positive future (i.e., experimental) condition, and 86 (49.4%) participants were randomly assigned to the ordinary future (i.e., control) condition. To ensure there were no unanticipated differences between conditions, a one-way analysis of variance (ANOVA) was conducted on demographics, pre-existing perceptions of the future, and problem gambling severity. Importantly, participants did not differ between conditions on age,  $F(1, 172) = 0.25, p = .62$ , gender,  $\chi^2(1) = 1.88, p = .17$ , pre-existing positive and negative perceptions of their future without gambling,  $F(1, 172) = 0.30, p = .48$ , nor their problem gambling severity,  $F(1, 172) = 0.38, p = .54$ . Therefore, there were no differences in measured variables between conditions that were likely to influence the effectiveness of the manipulation.

To test whether the manipulation was successful, a one-way ANOVA was performed with manipulation condition as the independent variable (1 = positive future condition, 0 = ordinary future condition) and longing for the future as the dependent variable. Results suggested that participants in the positive future condition ( $M = 5.33, SD = 1.05$ ) reported significantly higher levels of longing compared to participants in the ordinary future condition ( $M = 4.96, SD = 1.27$ ),  $F(1, 172) = 4.34, p = .04$ . Therefore, the manipulation was effective in heightening longing for the future. Moreover, the manipulation also had a significant direct effect on readiness to change,  $F(1, 169) = 8.41, p = .004$ , where participants in the positive future condition ( $M = 6.82, SD = 1.91$ ) reported higher levels of readiness to change than participants in the ordinary future condition ( $M = 5.92, SD = 2.16$ ).

To ensure proper assumptions were met for the experimental regression analysis, the data were screened for linearity, multivariate normality, homogeneity of variances, multivariate outliers, and multicollinearity in each condition. Of note, data were collected independently with no known connection, providing support for the independence of observations assumption.

**Linearity.** Visual inspection of scatterplots between the independent variable (i.e., longing for the future) and covariate (i.e., perceptions of the future) against the dependent variable (i.e., readiness to change) in both conditions demonstrated linear associations. Therefore, the assumption of linearity was met.

**Multivariate Normality.** To test for multivariate normality within each manipulation condition, Mardia's test for multivariate skewness and kurtosis (Cain et al., 2017) was conducted among the three dependent variables of interest (i.e., longing for the future, perceptions of the future, readiness to change). Results did not reveal multivariate skewness,  $b = 0.79$ ,  $z = 10.89$ ,  $p = .37$ , nor kurtosis,  $b = 17.04$ ,  $z = 1.70$ ,  $p = .09$ , in the ordinary future condition. In the positive future condition, Mardia's test demonstrated significant multivariate skewness,  $b = 1.40$ ,  $z = 20.48$ ,  $p = .02$ , but not kurtosis,  $b = 16.25$ ,  $z = 1.07$ ,  $p = .28$ . To account for multivariate skewness in the positive future condition, the main analysis used bias-corrected bootstrapping for the confidence intervals (Preacher & Hayes, 2004).

**Homogeneity of Variances.** To test whether there was homogeneity of variances between manipulation conditions, Levene's test was conducted for the dependent measures of readiness to change, controlling for longing for the future and pre-existing perceptions of the future. Results suggested that the assumption of homogeneity of

variances was met,  $F(1, 169) = 0.67, p = .41$ . Therefore, equal variances can be assumed between manipulation conditions.

**Multivariate Outliers.** To examine for possible cases of multivariate outliers, a multiple linear regression was performed within each manipulation condition with readiness to change as the dependent variable and longing for the future and perceptions of the future as the independent variables. Mahalanobis Distance statistics were then saved for examination. No multivariate outliers were identified in the multiple regression model in both the ordinary future condition ( $MDs < 10.43, ps > .005$ ) and the positive future condition ( $MDs < 12.28, ps > .002$ ), thus all cases were retained.

**Multicollinearity.** To test for multicollinearity, correlation coefficients were calculated between the variables of interest in each manipulation condition. Multicollinearity was not a concern as the largest correlation coefficient observed between predictor variables in the positive future condition was between longing for the future and problem gambling severity,  $r(88) = .41, p < .001$ , and was between longing for the future and perceptions of the future in the ordinary future condition,  $r(86) = .57, p < .001$ . Both correlation coefficients were below the recommended cut-off value of  $r = .80$  (Cohen et al., 2003). See Table 10 for correlation coefficients between variables of interest.

### **Main Analyses**

Table 9 contains the means and standard deviations of the dependent measures for each condition, and Table 10 contains the correlation coefficients between the variables of interest in each condition.

I tested the hypothesized experimental mediation model using PROCESS Model 4 (version 4.0) in SPSS version 28. The manipulation conditions were entered as the

independent variable (1 = positive future condition, 0 = ordinary future condition), longing for the future as the mediating variable, readiness to change as the dependent variable, and the extent to which participants felt positively or negatively toward their future (completed prior to the manipulation) was entered as a covariate. For the indirect effect, statistical significance was assessed using bootstrapped 95% bias-corrected confidence intervals with 5000 iterations (Preacher & Hayes, 2004) with HC3 inferences (Davidson & MacKinnon, 1993).

Results from the experimental mediation analysis revealed a significant ( $p < .05$ ) and positive indirect effect,  $b = 0.15$ ,  $se = 0.09$ , 95% CI [0.009, 0.36], providing support for the hypothesis that longing for the future mediates the relation between an experimentally-induced positive future and the extent to which gamblers are ready to change their behaviour, while also controlling for their pre-existing perceptions of one's future without gambling. Specifically, gamblers in the positive future condition reported feeling more longing for a future without gambling,  $b = 0.32$ ,  $se = 0.16$ , 95% CI [0.01, 0.64], which in turn was associated with greater readiness to change,  $b = 0.47$ ,  $se = 0.16$ , 95% CI [0.15, 0.80] (see Figure 4 for direct and indirect effects). In total, the model explained 26.08% of the variance in future longing and 25.08% of the variance in readiness to change.

### **Discussion**

In Study 4, I experimentally tested the process by which positive perceptions of a future without gambling facilitates readiness to change among problem gamblers. To this end, approximately half of participants were asked to generate a positive aspect of their future that will exist when their gambling is no longer problematic. Other participants were asked to think about an ordinary aspect of their upcoming week. I expected that

participants who reflected on and wrote about a positive aspect of their future without gambling (compared to those who wrote about an ordinary future) would report heightened readiness to change to the extent that they felt longing for this better possible future.

Results revealed a significant direct effect of the manipulation on both longing for the future and readiness to change, wherein gamblers assigned to the positive future condition reported greater longing for a future without gambling as well as higher levels of readiness to change than those in the ordinary future condition. Importantly, results from the current study also revealed a significant indirect effect, providing support for the hypothesized mediation model. That is, gamblers in the positive future condition reported greater feelings of longing for this better possible future, and in turn reported significantly higher levels of readiness to change compared to gamblers in the ordinary future condition. These findings extend those from Studies 1 and 2 which demonstrated an association between a future focus and readiness to change by experimentally inducing a positive future focus to heighten both longing for a future without gambling and readiness to change. Specifically, Study 4 showed that the process by which a future focus readies gamblers for change is in part due to a heightened longing for this better possible future.

Unlike Study 3, a direct effect of the positive future manipulation on readiness to change was observed. Participants who reflected on and wrote about positive aspects of their future once their gambling is no longer problematic reported greater readiness to change their gambling behaviour than did participants in the control condition. Although results suggested that longing for the future partially mediates this relationship, the act of envisioning a better possible future alone may be effective at readying gamblers for

change. Indeed, the nature of the manipulation may have helped participants to make positive aspects of their future more vivid, which circumvents a commonly reported barrier to adopting a future focus (Hodgins & Engel, 2002; Noël et al., 2017; Salmon & Wohl, 2020). Like Oettingen (2000). I contend that the behaviour change utility of a future focus may lie in its ability to generate positive, vivid mental imagery. This imagery may then anchor gamblers to an object of future longing, which becomes the desired goal of what can be attained through behaviour change (Johannessen et al., 2012; Oettingen et al., 2001; Oettingen et al., 2010).

Of note, the results held when controlling for the extent to which gamblers felt optimistic or ambivalent about a future without gambling. Consequently, making salient a positive aspect of the future when gambling is no longer problematic appears to be an effective method of motivating change regardless of gamblers' pre-existing perceptions of what a gambling-free future may look like. Because ambivalence toward the behaviour change process as well as the future that results from said change is common among people living with addiction (Rollnick & Miller, 1995; Shaffer & Simoneau, 2001; Wulfert et al., 2006), these findings fill a significant gap in the existing literature by highlighting the benefits of a future focus among those experiencing ambivalence. While modern treatment modalities are designed to address ambivalence among people entering treatment (Miller & Rollnick, 2002; 2012; Moyers et al., 2009), many gamblers do not seek treatment for their gambling-related problems (Suurvali et al., 2008). Therefore, findings from the current study suggest that reflecting on and writing about positive aspects of a future that may occur once gambling is no longer a concern may yield longing for this better possible future and motivate self-directed action among non-treatment seeking gamblers.

### **Integrated Data Analysis**

The current program of research assessed the processes by which a past and future focus motivate behaviour change among people engaging in problem gambling behaviour through a methodological progression. However, yet to be tested is how a past focus compares to a future focus in motivating readiness to change gambling behaviour. To this end, an integrated data analysis (i.e., the analysis of pooled data from multiple studies; Curran & Hussong; 2009) was conducted using data from Studies 3 and 4 to assess the relative behaviour change utility of a past and future focus.<sup>2</sup> Specifically, data from Studies 3 and 4 were combined to form a quasi-experimental design in which participants were randomly assigned to either the positive past or ordinary past conditions, or the positive future or ordinary future conditions. However, for the purpose of the integrated data analysis, only data from participants randomly assigned to the positive past and positive future conditions were retained. Doing so allowed for a direct comparison of the effectiveness of eliciting a positive past before gambling compared to eliciting a positive future without gambling on motivating readiness to change with more degrees of freedom.

Importantly, both studies included pre-existing measures of the extent to which gamblers perceive their past before gambling as being positive or difficult, the extent to which gamblers perceive their future without gambling as being optimistic or ambivalent, and the degree to which they are ready to change their behaviour. Therefore, in addition to testing the relative behaviour change of a past and future focus, further assessments were made to examine for whom a past and future focus is most beneficial for.

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<sup>2</sup> Additional data were collected as a separate study in which participants were randomly assigned to the positive past or positive future conditions (as were used in Studies 3 and 4). However, severe data quality issues were present which resulted in an underpowered study where no meaningful conclusions could be drawn.

Specifically, pre-existing perceptions of the past and future may moderate the effectiveness of a positive past and positive future in motivating readiness to change. Thus, this integrated data analysis provides an experimental assessment of the effect of a past and future focus on readiness to change, in addition to the limits and boundaries of each effect.

### **Sample for Analysis**

The sample for the integrated dataset included a total of 221 problem gamblers (116 male, 103 female, 2 non-binary) who ranged in age from 19 to 76 years ( $M = 35.34$ ,  $SD = 11.15$ ). Of the 221 problem gamblers, 16 (7.2%) were screened as moderate-risk (PGSI score between 3 and 7), and 205 (92.8%) were screened as high-risk (PGSI score of 8 and above).

## **Results**

### **Preliminary Analyses**

A total of 133 (60.2%) participants were in the positive past condition (Study 3) and 88 (39.8%) participants were in the positive future condition (Study 4). To ensure there were no unanticipated differences between conditions (and thus between studies included in the integrated analysis), a series of one-way analyses of variances (ANOVA) were conducted on pre-manipulation measures and problem gambling severity. Preliminary analyses revealed no significant differences between conditions for participants' age,  $F(1, 217) = 0.94, p = .33$ , gender,  $\chi^2 = 1.35, p = .51$ , or problem gambling severity,  $F(1, 219) = 0.03, p = .86$ . Participants also did not differ in the extent to which they perceived their past before gambling as being positive or negative,  $F(1, 219) = 0.08, p = .78$ , or the extent to which they perceived their future without gambling optimistically or ambivalently,  $F(1, 219) = 0.56, p = .46$ . Therefore, there were no

differences in measured variables between conditions that were likely to influence the results of the main analyses.

**ANOVA Assumptions.** To ensure proper assumptions were met for the ANOVA, the integrated data were screened for normality and homogeneity of variances. Of note, data from participants in the positive past condition were collected at a separate timepoint than data from participants in the positive future condition, which represents a potential threat to the assumption of independence. However, participants were randomly assigned to these conditions in their respective primary studies, indicating that data were originally collected without any known connection. The assumption of normality was violated, as readiness to change in both the positive past condition,  $D(132) = .15, p < .001$ , and the positive future condition,  $D(88) = .19, p < .001$ , did not follow a normal distribution. However, violations to normality are not a concern as the sampling distribution of the  $F$  test statistic is robust to non-normality (Schmider et al., 2010). Levene's test also revealed that variance in residuals for readiness to change was equally distributed across groups,  $F(1, 218) = 1.41, p = .24$ , indicating that the assumption of homogeneity of variances was met.

**Regression Assumptions.** Additional assumptions (i.e., linearity, multivariate normality, homogeneity of variances, multivariate outliers, multicollinearity) were also tested to ensure the experimental moderation analysis was suitable. The assumption of linearity was met by visually inspecting scatterplots between the covariates (i.e., perceptions of the past and perceptions of the future) against the dependent variable (i.e., readiness to change) in both conditions, which demonstrated linear associations. Mardia's test for multivariate skewness and kurtosis also revealed significant multivariate skewness among perceptions of the past and readiness to change in the positive past

condition,  $b = 0.97$ ,  $z = 21.29$ ,  $p < .001$ , but not the positive future condition,  $b = 0.47$ ,  $z = 6.93$ ,  $p = .14$ . Multivariate kurtosis was not present in either condition ( $ps > .33$ ).

Mardia's test also demonstrated significant multivariate skewness among perceptions of the future and readiness to change in the positive past condition,  $b = 0.72$ ,  $z = 15.93$ ,  $p = .003$ , and in the positive future condition,  $b = 0.92$ ,  $z = 13.49$ ,  $p = .009$ . Multivariate skewness was again absent in both condition ( $ps > .23$ ).

Levene's test was conducted again to examine variation in residuals for readiness to change between conditions, controlling for perceptions of the past and perceptions of the future separately. Results revealed that the assumption of homogeneity of variances was met when controlling for perceptions of the past,  $F(1, 218) = 1.07$ ,  $p = .30$ , and when controlling for perceptions of the future,  $F(1, 218) = 2.81$ ,  $p = .10$ . Mahalabonis Distance tests also revealed no multivariate outliers when controlling for perceptions of the past in either the positive past condition ( $MDs < 6.24$ ,  $ps > .01$ ) or the positive future condition ( $MDs < 7.49$ ,  $ps > .006$ ). There were also no multivariate outliers when controlling for perceptions of the future in the positive future condition ( $MDs < 8.42$ ,  $ps > .004$ ), though one multivariate outlier was identified in the positive past condition ( $MD = 11.95$ ,  $p = .0005$ ). The moderation analysis in which perceptions of the past moderated the influence of the manipulation conditions on readiness to change was run with and without the outlier to determine impact. However, there was no change in the direction or the significance of the direct and indirect effects, and thus the outlier was retained for the main analysis. Lastly, multicollinearity was not a concern as the largest correlation coefficients observed in both the positive past condition ( $rs < .46$ ) and positive future condition ( $rs < .36$ ) were below the recommended cut-off value of  $r = .80$  (Cohen et al., 2003).

### Main Analyses

**ANOVA.** A one-way ANOVA was conducted to compare readiness to change between the positive past and positive future manipulation conditions. However, results demonstrated a non-significant omnibus test,  $F(1, 218) = 2.65, p = .11, \eta^2 = .01$ . That is, there was no significant difference observed in readiness to change between the positive past ( $M = 6.35, SD = 2.21$ ) and positive future ( $M = 6.82, SD = 1.91$ ) conditions (see Figure 5).

**Moderation Analysis.** To explore whether gamblers' perceptions of their past and future prior to completing the manipulation moderated the degree of influence of each manipulation condition on readiness to change, two moderation models were conducted using PROCESS (version 4.0) Model 1 with bootstrapping (5000 iterations) and HC3 inference. Manipulation conditions (0 = positive past condition, 1 = positive future condition) were entered as the independent variable, readiness to change was the dependent variable, and perceptions of the past was the moderating variable in the first model, and perceptions of the future was the moderating variable in the second model.

There was no significant interaction between the positive manipulation conditions and perceptions of the past on readiness to change,  $b = -0.07, se = 0.22, 95\% CI [-0.51, 0.36]$ . Therefore, the degree to which gamblers perceived their past before gambling as either positive or difficult did not influence which manipulation condition was more effective in motivating readiness to change (see Figure 6 for direct effects;  $R^2 = 0.05$ ). There was also no significant interaction between the positive manipulation conditions and perceptions of the future on readiness to change,  $b = 0.26, se = 0.28, 95\% CI [-0.30, 0.82]$ . As such, the degree to which gamblers perceived their future without gambling as being optimistic or ambivalent also did not influence which manipulation condition was

more effective in motivating readiness to change (see Figure 7 for direct effects;  $R^2 = 0.08$ ).

### **Discussion**

The purpose of the integrated data analysis was to examine the relative behaviour change utility of a past and future focus among people engaging in problem gambling behaviour. To this end, data from participants who were manipulated to focus on a positive past (Study 3) or a positive future (Study 4) were combined to test possible differences in self-reported readiness to quit or cut down on their gambling behaviour. Results of the integrated data analysis revealed no between-condition differences in readiness to change. Gamblers who reflected on a positive moment from their pre-addicted past reported statistically similar levels of readiness to change to gamblers who reflected on a positive aspect of their future once gambling is no longer problematic. Consequently, a past and future focus may have similar behaviour change utility.

Participants in the positive past and positive future conditions also did not differ in the extent to which they reported their pre-addicted past to be positive or difficult. Similarly, there were no between group differences in the extent to which participants reported feeling optimistic or ambivalent about a future free from gambling problems. These findings are in line with work by Vartanian and colleagues (2016) that has shown thoughts about both past and future food intake resulted in equivalent decreases to one's current food intake. Findings from the current study suggest that both a past and future focus are not only similarly beneficial in motivating change for gambling behaviour, but that both approaches appear to be effective irrespective of gamblers' pre-existing beliefs about their past or future. In other words, gamblers with difficulties in their pre-addicted past may benefit from a task that asks them to reflect on and then write about positive

aspects of their past or future. Similarly, gamblers who feel ambivalent about a future without gambling may benefit from reflecting and writing about positive aspects of their past or future.

Although the results of the integrated data analysis suggest that both a past and future focus are effective in readying gamblers for change, there are several limitations that should be noted. First, data for Studies 3 and 4 were not collected simultaneously, which introduces sampling heterogeneity (Hussong et al., 2013). However, comparisons between study conditions revealed no significant differences in sample characteristics (i.e., age, gender, problem gambling severity) or pre-existing perceptions of participants' pre-addicted past or gambling-free future. As such, no measured variables contributed to sampling heterogeneity. Second, for the purpose of comparing readiness to change across two positive temporal manipulation conditions, a greater sample size is needed for sufficient power. Greater effect sizes were expected when comparing the positive past and positive future conditions to the control conditions based on the manipulations' heightened effect on longing. As a result, smaller sample sizes were deemed necessary in Studies 3 and 4. Because both a positive past and positive future condition heighten readiness to change via increased longing for a time in which gambling was not problematic, a greater sample size is necessary to detect this small between-subjects effect. Lastly, only temporal-specific variables were included in each dataset, which does not allow for differentiation of the process by which a past and future focus motivate change. That is, nostalgic longing for the pre-addicted past and longing for a better possible future without gambling could not be assessed as mediators exclusive to each temporal condition in the integrated data analysis. Despite this limitation, previous

studies in the current program of research have systematically demonstrated that longing is a key component in readying gamblers for behaviour change.

Taken together, findings from the integrated data analysis suggest there is no superior temporal focus. Specifically, a past focus is not more or less effective than a future focus in readying gamblers for change, and vice versa. Rather, the utility of a past and future focus may instead lie in its ability to make salient positive moments in life before gambling became problematic, or positive aspects of a future in which gambling is longer problematic, when contrasted with current gambling-related struggles (Kim & Wohl, 2015; Oettingen, 2000; Oettingen et al., 2001; Salmon et al., 2018; Wohl et al., 2018).

### **General Discussion**

People living with addiction often do not take the necessary action to change their behaviour, even when their behaviour yields negative consequences (DiClemente et al., 1991; Petry, 2005; Suurvali et al., 2008). To understand how and why some people can and do engage in positive behaviour change, both the literature and current treatment modalities have emphasized the benefits of adopting a future focus—one that focuses the person on a better possible future that can result from cutting down on or ceasing engagement in the addictive behaviour altogether (Johannessen et al., 2012; Markus & Nurius, 1986; Miller & Rollnick, 2002; Oettingen et al., 2010). In contrast, a small (but growing) body of research has demonstrated that a past focus has utility for motivating behaviour change when focus is placed on a time before the addictive behaviour become problematic (Nuske & Hing, 2013; Salmon et al., 2018; Wohl et al., 2018). Yet unknown are the limiting conditions of each approach, or whether both foci are equivalent in their ability to yield behaviour change. In the current program of research, across four studies

and an integrated data analysis, I systematically examined the content, process, and limiting conditions of the ability of a past or future focus to motivate behaviour change among people living with problem gambling.

Study 1 used a qualitative approach to first explore the meaning that gamblers assign to their lived past experiences before gambling and anticipated future experiences once their gambling is no longer problematic, and how these experiences relate to readiness to change gambling behaviour. Results of the numerically aided phenomenological assessment revealed that two types of past narratives (i.e., positive versus difficult) and two types of future narratives (i.e., optimistic versus ambivalent) emerged. Those who wrote about a positive past (compared to those with a difficult past) reported longing for this time in their life and were more ready to change their gambling behaviour. Similarly, gamblers who wrote optimistically about a future without gambling also reported more longing for this future and more desire to change their gambling behaviour. However, not all gamblers have a positive past to draw from or feel optimistic about what a future without gambling might entail, which can undermine readiness to change (Låftman et al., 2020; Salmon & Wohl, 2020).

Study 2 extended these findings by employing a correlational design to assess how positive and negative perceptions of the pre-addicted past are associated with readiness to change, as well as the process through which this may occur. Support was found for my hypothesized mediation model—a model in which readiness to change is elevated by a focus on positive aspects of one's past that existed before the addictive behaviour became problematic because such a focus elicits nostalgic reverie for that pre-addicted past. This indirect effect was then replicated and extended in Study 3 using an experimental design. Specifically, participants who were manipulated to focus on a

positive past (compared to an ordinary past) reported significantly greater feelings of nostalgia for their pre-addicted past, which in turn were associated with greater readiness to change. Importantly, the manipulation was effective at promoting longing for the pre-addicted past when controlling for the extent to which gamblers perceived their past before gambling as being positive or difficult.

In the current research, I also found that gamblers who felt optimistic about a future without gambling reported being more ready to change their current behaviour to the extent that they felt a sense of longing for this possible future. This effect was observed when both a correlational (Study 2) and experimental (Study 4) design were employed. Specifically, gamblers who were manipulated to reflect on and write about a positive aspect of their future that they expect to exist once their gambling is no longer problematic (compared to those instructed to reflect on an ordinary future) reported greater feelings of longing for this better possible future, which facilitated greater readiness to change. Taking into consideration the results from Studies 1 and 2 which showed that ambivalence toward a gambling-free future represents a significant limit to a future focus, the experimental mediation controlled for the extent to which gamblers felt optimistic or ambivalent about their possible future. Importantly, the manipulation remained effective at heightening longing for a future without gambling when controlling for gamblers' perceptions of this future.

An integrated data analysis was also conducted to determine whether a past or future focus was superior in motivating readiness to change among people engaging in problem gambling behaviours. However, results revealed no differences in readiness to change between the positive past condition (Study 3) and the positive future condition (Study 4), and no significant interactions with gamblers' positive and negative

perceptions of their life before gambling or future without gambling. Coupled with the demonstrated effects of the positive past and future conditions on longing and readiness to change when compared to the ordinary control conditions, both a past focus and future focus appear to be similarly effective in readying gamblers for change. Despite the growing body of evidence on nostalgia as a means to facilitate behaviour change among people engaging in addictive behaviour (Kim & Wohl, 2015; Salmon et al., 2018; Wohl et al., 2018), the past has been largely ignored in favour of focusing the person on a better possible future (Manthey et al., 2011; Rollnick et al., 2008; Salmon et al., 2017). Herein, I demonstrated that a past focus that elicits nostalgia is comparable to a future focus that elicits longing for a better possible future in motivating change among people engaging in problem gambling behaviour.

Taken together, results from the current program of research suggest that readiness for change is a function of sentimental longing (i.e., wistful reflection) for a better life, regardless of whether the longing is focused on a better time in one's past or a better possible future without gambling. This finding is reminiscent of Hodgins and el-Guebaly (2000), who found that emotions associated with various life events (rather than the events themselves) were influential to gamblers' recovery processes, highlighting the importance of emotions in catalyzing behaviour change. Positive emotions, for example, engender an approach motivation (i.e., approaching change; Frederickson, 2001) and helps sustain long-term behaviour change (van Cappellen et al., 2018; Frederickson, 2013). In the context of the current program of research, reframing past and anticipated future experiences in a positive light promoted temporal-specific longing for life without the addictive behaviour. In other words, inducing a positive past and future among

gamblers (even when one is not readily accessible) is one such way to heighten the emotional force of longing, which readies people for change.

### **Implications**

For many people living with addiction, the onset of addictive behaviour can stem from difficulties in their past, which can include relationship strain, poverty, and trauma, among others (Hellman et al., 2015; Maté, 2014). In fact, there is a tendency for people living with addiction to report experiencing more hardships in life compared to the general population (Black et al., 2006; Dowling et al., 2016; Folino & Abair, 2009; Hollander et al., 2000). Gambling is often reported used to escape or cope with these negative life events (Stewart & Zack, 2008). In line with previous research showing that people living with problem gambling are more likely to hold negative perceptions of their past compared to those who gamble recreationally (Hodgins & Engel, 2002), a difficult past represents a significant limit to adopting a past focus as a means of motivating behaviour change. Results from the current research suggest that guiding gamblers to focus on a positive point of their past, one in which they felt safe and secure, can effectively facilitate change even among those who report a experiencing a difficult past.

Importantly, there is also behaviour change utility in focusing problem gamblers on a better possible future without gambling, particularly among those who feel ambivalent about this future. Ambivalence about the future is common among people engaging in addictive behaviours (Amos et al., 2006; Shaffer & Simoneau, 2001), and may stem from the shortened time horizons found among problem gamblers (Hodgins & Engel, 2002). In fact, ambivalence is such a ubiquitous component of recovery that many treatment modalities (e.g., Motivational Interviewing; Miller & Rollnick, 2002) are designed to work with and address client ambivalence (Wulfert et al., 2006). If left

unaddressed, ambivalence can undermine both the treatment process (Shaffer, 1994; Shaffer & Simoneau, 2001; Wulfert et al., 2006) and motivation to change addictive behaviour (Salmon & Wohl, 2020). In Study 4, however, gamblers who felt ambivalent about a future without gambling benefited from a future focus. By making salient a positive aspect of the future that will result from gambling cessation, those who felt ambivalent about the future were able to generate positive and vivid imagery which heightened longing for this better possible future. Therefore, a future focus (when induced) can still motivate change among those who may not readily believe their future without gambling will be wholly positive.

Because most people who engage in problematic gambling either do not seek formal treatment services or face barriers in seeking access (Evans & Delfabbro, 2005; Gainsbury et al., 2014; Suurvali et al., 2008), novel means to promote self-directed change among community gamblers have been introduced in recent years with considerable efficacy. One such method is the use of brief interventions, which often comprise one session and can involve provision of self-directed materials, information, and motivational strategies, among others, to support behaviour change (Swan & Hodgins, 2015). Brief interventions (delivered online or in-person) have been shown to be effective in reducing gambling involvement and gambling-related problems (Petry et al., 2017; Swan & Hodgins, 2015; Quilty et al., 2019). Therefore, the temporal manipulation conditions from the current study can inform the development of brief interventions to enhance motivation by encouraging gamblers to reflect on and make salient positive aspects of their past and future (e.g., DiClemente et al., 2017). In doing so, they may re-establish their goals of what is to be reclaimed or achieved through changing their gambling behaviour.

Lastly, the current findings lend support for behaviour change utility of both *looking forward* and *looking back*, which are core Motivational Interviewing practices (Miller & Rollnick, 2002; 2012). Interestingly, despite *looking back* being fundamental to Motivational Interviewing, a paucity of empirical attention has been paid to it and treatment providers tend to neglect a past focus and instead focus on the future (Manthey et al., 2011; Salmon et al., 2017). That is, in practice, *looking back* is largely ignored in favour of *looking forward* due, in part, to the many difficulties and negative life events in clients' pasts (Kausch et al., 2006). The results of the current program of work suggest it may behoove treatment providers help clients to find both positive moments in the past (in which they felt safe and secure) in addition to helping clients focus on how their future will improve in the absence of gambling.

### **Limitations and Future Directions**

Several limitations of the current research should be noted. First, the program of research assessed readiness to change as the primary outcome of interest and did not follow up with participants over time to determine whether temporal focus predicted action taken to quit or cut down on gambling. Readiness to change does not guarantee that people will take action (Webb & Sheeran, 2006). Indeed, many gamblers fall in and out of the cycle of change and revert back to earlier stages even after action is taken (Carbonari et al., 1999; Prochaska et al., 1992). Moreover, resistance to change is common, and people living with addiction often remain stuck in the pre-contemplation stage (Evans & Delfabbro, 2005). Therefore, determining factors and manipulation conditions which move gamblers further through the stages of change is promising.

Prior research has shown that nostalgia for the pre-addicted self facilitated quit attempts among people engaging in problem gambling behaviour one month (Wohl et al.,

2018) and three months later (Salmon et al., 2018). Moreover, mental contrasting of a positive future also resulted in action taken to reduce cigarette consumption (Oettingen et al., 2010), and having a positive possible future self resulted in increased engagement with health-related behaviours (Hooker, 1992). Thus, although the current program of research is limited in the inferences that can be made regarding the action and maintenance of behaviour change over time, these findings can be situated in the larger literature which demonstrates that a past and future focus have some utility in motivating action to change addictive or problematic behaviour. Future research is encouraged to extend this work by tracking gamblers over time (e.g., every six months) to determine the influence of a past and future focus in both triggering action to quit or cut down on gambling behaviour, as well as the extent to which these changes lead to behaviour change maintenance.

Second, both Studies 3 and 4 only manipulated the independent variable (i.e., positive versus ordinary past, positive versus ordinary future) to experimentally test the hypothesized mediation model. This measurement-of-mediation design a common mediation practice in experimental social psychology (Spencer et al., 2005), however, temporal precedence and causal links between the mediator (i.e., longing) and the dependent variable (i.e., readiness to change) cannot be inferred as this association remains correlational (Jacoby & Sassenberg, 2011; Stone-Romero & Rosopa, 2008). Based on best practices outlined by Pirlott and MacKinnon (2016), recommendations for experimental mediation include manipulation of the mediating variable to address these limitations. Yet, in both measurement-of-mediation and manipulation-of-mediator designs, there remains potential for confounding variables to explain relationships observed between variables of interest (Frank, 2000). Therefore, causal inferences cannot

be made from these data and caution should be taken in interpreting the order of effects until future studies are able to replicate and extend these findings. Some confidence is afforded in the mediation models, as I was able to replicate correlational findings in an experimental measurement-of-mediation design. Moreover, I relied on theory to guide the temporal precedence of this work, which suggests that emotional responses stem from cognitive appraisals and precede behavioural responses (e.g., Smollen, 2006). Future research would do well to extend results by manipulating longing (both for the past and future) and further replicating these results using a double randomization design in which both the independent variable and mediator are manipulated (Jacoby & Sassenberg, 2011).

Lastly, the current program of work is limited in that I examined the process by which a past and future focus motivate self-directed change separately. The integrated data analysis sought to remedy this in part by comparing the utility of a positive past and positive future focus in motivating readiness to change and the degree to which perceptions of the past or future moderate this utility. However, I am not able to make inferences about the extent to which nostalgia for the pre-addicted past or longing for a better possible future uniquely explain partial variance in their respective temporal conditions. In the context of addictive behaviour, little is known about whether nostalgic longing for the pre-addicted past is uniquely elicited through a past focus relative to a future focus and whether longing for a better possible future is an exclusive outcome of a future focus compared to a past focus. Future research should therefore consider comparing and contrasting a past and future focus in a new study to replicate the results of the integrated data analysis. In designing a more intentional experimental study, the mediating variables from the current studies (i.e., longing) can be included (and

manipulated) to underscore the unique process by which a past and future focus motivates change.

It is also possible that nostalgia for the pre-addictive past and longing for a future without the addictive behaviour can both be heightened through a past and future focus. Mental time travel lies at the heart of people's ability to reflect on the past and anticipate the future (Epstude & Peetz, 2012), which may reveal similar processes in how people perceive their past before gambling and their future without gambling (Ross & Wilson, 2002; Schacter et al., 2007; Vartanian et al., 2016). Prior research has shown that nostalgia elicits optimism for the future (Cheung et al., 2013), revealing further commonalities between a past and future focus. In addition, problem gamblers (Reith & Dobbie, 2012) and problem drinkers (Berg & Miller, 1992) in treatment often refer to their past nostalgically when describing a future without gambling problems. Therefore, people living with problem gambling may draw motivation from both the pre-addicted past and a better possible future in readying themselves for change. Future research may thus explore how a past and future focus work in tandem in the context of changing addictive behaviour.

### **Conclusion**

Although problem gambling is difficult to overcome, some people are motivated to take action to quit or cut down on their gambling behaviour. The current program of research demonstrates that motivation to change may lie in the extent to which people feel nostalgic longing for positive moments in their life before their gambling became problematic, or longing for positive expectations of their life after their gambling is no longer problematic. Although difficulties in the past and ambivalence about the future can undermine readiness to change, results suggested that a past and future focus (when

induced) are effective regardless of how people feel about their past and future. When readying oneself for change, people engaging in problem gambling behaviour are encouraged to reflect on positive moments from their past in which they felt safe and secure as well as positive aspects of a future that will result from the cessation of gambling. Doing so may motivate self-directed change among those who otherwise would not.

## References

- Abeyta, A. A., Routledge, C., & Juhl, J. (2015). Looking back to move forward: Nostalgia as a psychological resource for promoting relationship goals and overcoming relationship *Journal of Personality and Social Psychology*, *109*(6), 1029-1094.
- Adams, J. (2009). The role of time perspective in smoking cessation amongst older English adults. *Health Psychology*, *28*(5), 529-534.
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> Edition (DSM-V)*. Washington: American Psychiatric Association.
- Amos, A., Wiltshire, S., Haw, S., & McNeill, A. (2006). Ambivalence and uncertainty: experiences of and attitudes towards addiction and smoking cessation in the mid-to-late teens. *Health Education Research*, *21*(2), 181-191.
- Anderberg, M. (1973). *Cluster Analysis for Applications*. Academic Press.
- Apostolidis, T., Fieulaine, N., Simonin, L., & Rolland, G. (2006). Cannabis use, time perspective and risk perception: Evidence of a moderating effect. *Psychology and Health*, *21*(5), 571-592.
- Baldwin, M. (2015). *Bringing the past to the present: Temporal self-comparison processes moderate nostalgia's effect on well-being* (Doctoral dissertation, University of Kansas).
- Beenstock, J., Adams, J., & White, M. (2010). The association between time perspective and alcohol consumption in university students: cross-sectional study. *The European Journal of Public Health*, *21*(4), 438-443.
- Berg, I. K., & Miller, S. D. (1992). *Working with the problem drinker: A solution-focused approach*. WW Norton & Co.

- Bergevin, T., Gupta, R., Derevensky, J., & Kaufman, F. (2006). Adolescent gambling: Understanding the role of stress and coping. *Journal of Gambling Studies, 22*(2), 195-208.
- Bergh, C., & Kühlhorn, E. (1994). Social, psychological and physical consequences of pathological gambling in Sweden. *Journal of Gambling Studies, 10*, 275-285.
- Best, J., & Nelson, E. E. (1985). Nostalgia and discontinuity: A test of the Davis hypothesis. *Sociology and Social Research, 69*, 221-233.
- Biener, L., & Abrams, D. B. (1991). The Contemplation Ladder: Validation of a measure of readiness to consider smoking cessation. *Health Psychology, 10*, 360-365.
- Black, D. W., Monahan, P. O., Temkit, M., & Shaw, M. (2006). A family study of pathological gambling. *Psychiatry Research, 141*(3), 295–303.
- Blackwell, S. E., Rius-Ottenheim, N., Schulte-van Maaren, Y. W., Carlier, I. V., Middelkoop, V. D., Zitman, F. G., ... & Giltay, E. J. (2013). Optimism and mental imagery: A possible cognitive marker to promote well-being?. *Psychiatry Research, 206*(1), 56-61.
- Blaszczynski, A., & Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction, 97*(5), 487-499.
- Boyd, J. N., & Zimbardo, P. G. (2005). Time Perspective, Health, and Risk Taking. In A. Strathman & J. Joireman (Eds.), *Understanding behavior in the context of time: Theory, research, and application* (pp. 85-107). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.
- Browne, M., Rawat, V., Greer, N., Langham, E., Rockloff, M., & Hanley, C. (2017). What is the harm? Applying a public health methodology to measure the impact

of gambling problems and harm on quality of life. *Journal of Gambling Issues*, (36), 28-50.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data?. *Perspectives on Psychological Science*, 6(1), 3-5.

Cain, M. K., Zhang, Z., & Yuan, K. H. (2017). Univariate and multivariate skewness and kurtosis for measuring nonnormality: Prevalence, influence and estimation. *Behavior Research Methods*, 49(5), 1716-1735.

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology*, 70(1), 141-156.

Carbonari, J. P., DiClemente, C. C., & Sewell, K. B. (1999). Stage transitions and the transtheoretical "stages of change" model of smoking cessation. *Swiss Journal of Psychology*, 58(2), 134-144.

Cheung, W. Y., Wildschut, T., Sedikides, C., Hepper, E. G., Arndt, J., & Vingerhoets, A. J. (2013). Back to the future: Nostalgia increases optimism. *Personality and Social Psychology Bulletin*, 39, 1484-1496.

Clarke, D., Abbott, M., DeSouza, R., & Bellringer, M. (2007). An overview of help seeking by problem gamblers and their families including barriers to and relevance of services. *International Journal of Mental Health and Addiction*, 5(4), 292-306.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). Outliers and multicollinearity: Diagnosing and solving regression problem II. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, 390-430.

- Cowlishaw, S., Suomi, A., & Rodgers, B. (2016). Implications of gambling problems for family and interpersonal adjustment: results from the Quinte Longitudinal Study. *Addiction, 111*(9), 1628-1636.
- Cox, B. J., Yu, N., Afifi, T. O., & Ladouceur, R. (2005). A national survey of gambling problems in Canada. *The Canadian Journal of Psychiatry, 50*(4), 213-217.
- Crump, M. J., McDonnell, J. V., & Gureckis, T. M. (2013). Evaluating Amazon's Mechanical Turk as a tool for experimental behavioral research. *PloS one, 8*(3), e57410.
- Cunningham, J. A., & Breslin, F. C. (2004). Only one in three people with alcohol abuse or dependence ever seek treatment. *Addictive Behaviors, 29*(1), 221-223.
- Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods, 14*(2), 81-100.
- Dąbrowska, K., Moskalewicz, J., & Wieczorek, Ł. (2017). Barriers in access to the treatment for people with gambling disorders. Are they different from those experienced by people with alcohol and/or drug dependence?. *Journal of Gambling Studies, 33*(2), 487-503.
- Daryanto, A. (2020). Tutorial on heteroskedasticity using heteroskedasticityV3 SPSS macro. *The Quantitative Methods for Psychology, 16*(5), 8-20.
- Davidson, R., & MacKinnon, J. G. (1993). *Estimation and inference in econometrics*. Oxford: Oxford University Press.
- Davis, F. (1979). *Yearning for yesterday: A sociology of nostalgia*. New York: Free Press.
- Dickerson, M., Hinchy, J., & England, S. L. (1990). Minimal treatments and problem gamblers: A preliminary investigation. *Journal of Gambling Studies, 6*(1), 87-102.

- DiClemente, C. C. (1993). Changing addictive behaviors: A process perspective. *Current Directions in Psychological Science*, 2, 101-106.
- DiClemente, C. C., Corno, C. M., Graydon, M. M., Wiprovnick, A. E., & Knoblach, D. J. (2017). Motivational interviewing, enhancement, and brief interventions over the last decade: A review of reviews of efficacy and effectiveness. *Psychology of Addictive Behaviors*, 31(8), 862-887.
- DiClemente, C.C., Prochaska, J.O., Fairhurst, S., Velicer, W.F., Rossi J.S., & Velasquez, M. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation and contemplation/action. *Journal of Consulting and Clinical Psychology*, 59, 295-30.
- DiClemente, C. C., Story, M., & Murray, K. (2000). On a roll: The process of initiation and cessation of problem gambling among adolescents. *Journal of Gambling Studies*, 16(2-3), 289-313.
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71-75.
- Dowling, N. A., Shandley, K., Oldenhof, E., Youssef, G. J., Thomas, S. A., Frydenberg, E., & Jackson, A. C. (2016). The intergenerational transmission of problem gambling: The mediating role of parental psychopathology. *Addictive Behaviors*, 59, 12–17.
- el-Guebaly, N., Casey, D. M., Currie, S. R., Hodgins, D. C., Schopflocher, D. P., Smith, G. J., & Williams, R. J. (2015, February). *The Leisure, Lifestyle, & Lifecycle Project (LLLP): A Longitudinal Study of Gambling in Alberta*. Final Report for the Alberta Gambling Research Institute.

- Epstude, K., & Peetz, J. (2012). Mental time travel: A conceptual overview of social psychological perspectives on a fundamental human capacity. *European Journal of Social Psychology, 42*(3), 269-275.
- Evans, L., & Delfabbro, P. H. (2005). Motivators for change and barriers to help-seeking in Australian problem gamblers. *Journal of Gambling Studies, 21*, 133-155.
- Everitt, B. S., Landau, S., & Leese, M. (2004). Cluster analysis. London: Arnold Press.
- Ferris, J., & Wynne, H. (2001). *The Canadian Problem Gambling Index*. Ottawa, ON: Canadian Centre on Substance Abuse.
- Finch, H. (2005). Comparison of distance measures in cluster analysis with dichotomous data. *Journal of Data Science, 3*(1), 85-100.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.
- Folino, J. O., & Abait, P. E. (2009). Pathological gambling and criminality. *Current Opinion in Psychiatry, 22*(5), 477-481.
- Fong, T. W. (2005). The biopsychosocial consequences of pathological gambling. *Psychiatry (Edgmont), 2*(3), 22-30.
- Frank, K. A. (2000). Impact of a confounding variable on a regression coefficient. *Sociological Methods & Research, 29*(2), 147-194.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*(3), 218-226.
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 359*(1449), 1367-1377.

- Fredrickson, B. L. (2013). Positive emotions broaden and build. In *Advances in Experimental Social Psychology* (Vol. 47, pp. 1-53). Academic Press.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*(3), 233-239.
- Gainsbury, S., & Blaszczynski, A. (2011). Online self-guided interventions for the treatment of problem gambling. *International Gambling Studies*, *11*(3), 289-308.
- Gainsbury, S., Hing, N., & Suhonen, N. (2014). Professional help-seeking for gambling problems: Awareness, barriers and motivators for treatment. *Journal of Gambling Studies*, *30*, 503-519.
- Griffiths, M. D., Wood, R. T. A., Parke, J., & Parke, A. (2006). Dissociative states in problem gambling. *Current Issues Related to Dissociation*, 27-37.
- Gupta, R., Derevensky, J., & Marget, N. (2004). Coping strategies employed by adolescents with gambling problems. *Child and Adolescent Mental Health*, *9*(3), 115-120.
- Hall, P. A., Fong, G. T., Yong, H. H., Sansone, G., Borland, R., & Siahpush, M. (2012). Do time perspective and sensation-seeking predict quitting activity among smokers? Findings from the International Tobacco Control (ITC) Four Country Survey. *Addictive Behaviors*, *37*(12), 1307-1313.
- Haslett, J., & Hayes, K. (1998). Residuals for the linear model with general covariance structure. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, *60*, 201-215.
- Hauser, D., Paolacci, G., & Chandler, J. (2019). Common concerns with MTurk as a participant pool: Evidence and solutions. In *Handbook of research methods in consumer psychology* (pp. 319-337). New York: Routledge.

- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Hayes, A. F., & Cai, L. (2007). Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behavior Research Methods, 39*(4), 709-722.
- Hellman, M., Majamäki, M., Rolando, S., Bujalski, M., & Lemmens, P. (2015). What causes addiction problems? Environmental, biological and constitutional explanations in press portrayals from four European welfare societies. *Substance Use & Misuse, 50*(4), 419–438.
- Henry, D., Dymnicki, A. B., Mohatt, N., Allen, J., & Kelly, J. G. (2015). Clustering methods with qualitative data: a mixed-methods approach for prevention research with small samples. *Prevention Science, 16*(7), 1007-1016.
- Hershfield, H. E. (2011). Future self-continuity: How conceptions of the future self transform intertemporal choice. *Annals of the New York Academy of Sciences, 1235*(1), 30-43.
- Higgins, E. T., & Chaires, W. M. (1980). Accessibility of interrelational constructs: Implications for stimulus encoding and creativity. *Journal of Experimental Social Psychology, 16*, 348-361.
- Hing, N., Holdsworth, L., Tiyce, M., & Breen, H. (2014). Stigma and problem gambling: Current knowledge and future research directions. *International Gambling Studies, 14*(1), 64-81.
- Hing, N., Nuske, E., & Gainsbury, S. (2011). *Gamblers at-risk and their help-seeking behaviour*. Melbourne: Gambling Research Australia.

- Hing, N., Nuske, E., Gainsbury, S. M., & Russell, A. M. (2016). Perceived stigma and self-stigma of problem gambling: perspectives of people with gambling problems. *International Gambling Studies, 16*(1), 31-48.
- Hing, N., Nuske, E., Tolchard, B., & Russell, A. (2015). What influences the types of help that problem gamblers choose? A preliminary grounded theory model. *International Journal of Mental Health and Addiction, 13*, 241-256.
- Hodgins, D. C. (2001). Processes of changing gambling behavior. *Addictive Behaviors, 26*(1), 121-128.
- Hodgins, D. C., Currie, S. R., & el-Guebaly, N. (2001). Motivational enhancement and self-help treatments for problem gambling. *Journal of Consulting and Clinical Psychology, 69*(1), 50-57.
- Hodgins, D. C., & El-Guebaly, N. (2000). Natural and treatment-assisted recovery from gambling problems: A comparison of resolved and active gamblers. *Addiction, 95*, 777-789.
- Hodgins, D. C., & Engel, A. (2002). Future time perspective in pathological gamblers. *The Journal of Nervous and Mental Disease, 190*, 775-780.
- Hodgins, D. C., Stea, J. N., & Grant, J. E. (2011). Gambling disorders. *The Lancet, 378*, 1874-1884.
- Hodgins, D. C., Wynne, H., & Makarchuk, K. (1999). Pathways to recovery from gambling problems: Follow-up from a general population survey. *Journal of Gambling Studies, 15*(2), 93-104.
- Hollander, E., Buchalter, A. J., & DeCaria, C. M. (2000). Pathological gambling. *Psychiatric Clinics of North America, 23*(3), 629-642.

Hooker, K. (1992). Possible selves and perceived health in older adults and college students. *Journal of Gerontology*, 47(2), 85-95.

Hussong, A. M., Curran, P. J., & Bauer, D. J. (2013). Integrative data analysis in clinical psychology research. *Annual Review of Clinical Psychology*, 9, 61-89.

IBM Knowledge Center. *Hierarchical Cluster Analysis*. Retrieved April, 2019 from: [https://www.ibm.com/support/knowledgecenter/SSLVMB\\_subs/statistics\\_mainhelpp\\_ddita/spss/base/idh\\_clus.html](https://www.ibm.com/support/knowledgecenter/SSLVMB_subs/statistics_mainhelpp_ddita/spss/base/idh_clus.html).

IBM Knowledge Center. *TwoStep Cluster Algorithms*. Retrieved April, 2019 from: [https://www.ibm.com/support/knowledgecenter/en/SSLVMB\\_22.0.0/com.ibm.spss.statistics.algorithms/alg\\_twostep.htm](https://www.ibm.com/support/knowledgecenter/en/SSLVMB_22.0.0/com.ibm.spss.statistics.algorithms/alg_twostep.htm).

Jacoby, J., & Sassenberg, K. (2011). Interactions do not only tell us when, but can also tell us how: Testing process hypotheses by interaction. *European Journal of Social Psychology*, 41(2), 180-190.

Ji, J. L., Holmes, E. A., & Blackwell, S. E. (2017). Seeing light at the end of the tunnel: Positive prospective mental imagery and optimism in depression. *Psychiatry Research*, 247, 155-162.

Johannessen, K. B., Oettingen, G., & Mayer, D. (2012). Mental contrasting of a dieting wish improves self-reported health behaviour. *Psychology & Health*, 27, 43-58.

Kausch, O., Rugle, L., & Rowland, D. Y. (2006). Lifetime histories of trauma among pathological gamblers. *The American Journal on Addictions*, 15(1), 35-43.

Kawada, C. L. K., Oettingen, G., Gollwitzer, P. M., & Bargh, J. A. (2004). The projection of implicit and explicit goals. *Journal of Personality and Social Psychology*, 86, 545-559.

- Keith, M. G., Tay, L., & Harms, P. D. (2017). Systems perspective of Amazon Mechanical Turk for organizational research: Review and recommendations. *Frontiers in Psychology, 8*, 1-19.
- Keough, K. A., Zimbardo, P. G., & Boyd, J. N. (1999). Who's smoking, drinking, and using drugs? Time perspective as a predictor of substance use. *Basic and Applied Social Psychology, 21*(2), 149-164.
- Khayyat-Abuaita, U., Ostojic, D., Wiedemann, A., Arfken, C. L., & Ledgerwood, D. M. (2015). Barriers to and reasons for treatment initiation among gambling help-line callers. *The Journal of Nervous and Mental Disease, 203*(8), 641-645.
- Kim, H. S., & Hodgins, D. C. (2017). Reliability and validity of data obtained from alcohol, cannabis, and gambling populations on Amazon's Mechanical Turk. *Psychology of Addictive Behaviors, 31*, 85-94.
- Kim, H. S., & Wohl, M. J. A. (2015). The bright side of feeling disconnected with the past self: Self-discontinuity (via nostalgia) increases readiness to change unhealthy behaviors. *Social Psychology and Personality Science, 6*, 229-237.
- Kim, H. S., Wohl, M. J. A., Salmon, M., & Santesso, D. (2017). When do problem gamblers help themselves? Self-discontinuity increases self-directed change over time. *Addictive Behavior, 64*, 148-153.
- Klingemann, H., & Sobell, L. C. (2007). *Promoting self-change from addictive behaviors*. Springer Science: Business Media, LLC.
- Klingemann, H., Sobell, M. B., & Sobell, L. C. (2010). Continuities and changes in self-change research. *Addiction, 105*, 1510-1518.
- Kowal, E., Gunthorpe, W., & Bailie, R. S. (2007). Measuring emotional and social wellbeing in Aboriginal and Torres Strait Islander populations: An analysis of a

Negative Life Events Scale. *International Journal for Equity in Health*, 6(1), 1-12.

Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics*, 50(6), 613-621.

Kuiken, D., & Miall, D. S. (2001). Numerically aided phenomenology: Procedures for investigating categories of experience. *Forum: Qualitative Social Research*, 2(1), 1-28.

Kushnir, V., Godinho, A., Hodgins, D. C., Hendershot, C. S., & Cunningham, J. A. (2016). Motivation to quit or reduce gambling: Associations between Self-Determination Theory and the Transtheoretical Model of Change. *Journal of Addictive Diseases*, 35(1), 58-65.

Kushnir, V., Godinho, A., Hodgins, D. C., Hendershot, C. S., & Cunningham, J. A. (2018). Self-directed gambling changes: trajectory of problem gambling severity in absence of treatment. *Journal of Gambling Studies*, 1-15.

Ladouceur, R., Boisvert, J. M., Pépin, M., Loranger, M., & Sylvain, C. (1994). Social cost of pathological gambling. *Journal of Gambling Studies*, 10(4), 399-409.

Låftman, S. B., Alm, S., Olsson, G., Sundqvist, K., & Wennberg, P. (2020). Future orientation, gambling and risk gambling among youth: A study of adolescents in Stockholm. *International Journal of Adolescence and Youth*, 25(1), 52-62.

Lesieur, H. R., & Custer, R. L. (1984). Pathological gambling: Roots, phases, and treatment. *The Annals of the American Academy of Political and Social Science*, 474(1), 146-156.

- Liang, D. H. Z. (2013). *Critical factors predicting willingness to seek professional treatment and informal support among frequent gamblers*. (Doctoral dissertation). Retrieved from Electronic Theses and Dissertations. (Accession No. 4740).
- Lubman, D., Rodda, S., Hing, N., Cheetham, A., Cartmill, T., Nuske, E., ... & Cunningham, J. (2015). Gambler self-help strategies: A comprehensive assessment of strategies and actions. *Melbourne: Gambling Research Australia*.
- Luce, C., Kairouz, S., Nadeau, L., & Monson, E. (2016). Life events and problem gambling severity: A prospective study of adult gamblers. *Psychology of Addictive Behaviors*, 30(8), 922–930.
- MacKillop, J., Anderson, E. J., Castelda, B. A., Mattson, R. E., & Donovanick, P. J. (2006). Divergent validity of measures of cognitive distortions, impulsivity, and time perspective in pathological gambling. *Journal of Gambling Studies*, 22(3), 339-354.
- Mahalanobis, P. C. (1936). Mahalanobis distance. *Proceedings National Institute of Science of India*, 49, 234-256.
- Mandara, J., & Murray, C. B. (2002). Development of an empirical typology of African American family functioning. *Journal of Family Psychology*, 16(3), 318-337.
- Manthey, T. J., Knowles, B., Asher, D., & Wahab, S. (2011). Strengths-based practice and motivational interviewing. *Advances in Social Work*, 12(2), 126-151.
- Markus, H., & Nurius, P. (1986). Possible selves. *American psychologist*, 41(9), 954-969.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2<sup>nd</sup> ed.). New York, NY: Guilford Press.
- Miller, W. R., & Rollnick, S. (2012). *Motivational interviewing: Helping people change* (3<sup>rd</sup> ed). New York: Guilford Press.

- Moyers, T. B., Martin, T., Houck, J. M., Christopher, P. J., & Tonigan, J. S. (2009). From in-session behaviors to drinking outcomes: a causal chain for motivational interviewing. *Journal of Consulting and Clinical Psychology, 77*(6), 1113-1124.
- Noël, X., Saeremans, M., Kornreich, C., Jaafari, N., & D'Argembeau, A. (2017). Future-oriented mental time travel in individuals with disordered gambling. *Consciousness and Cognition, 49*, 227-236.
- Nower, L., Derevensky, J. L., & Gupta, R. (2004). The relationship of impulsivity, sensation seeking, coping, and substance use in youth gamblers. *Psychology of Addictive Behaviors, 18*(1), 49-55.
- Nuske, E., & Hing, N. (2013). A narrative analysis of help-seeking behaviour and critical change points for recovering problem gamblers: the power of storytelling. *Australian Social Work, 66*, 39-55.
- Oettingen, G. (2000). Expectancy effects on behavior depend on self-regulatory thought. *Social Cognition, 18*, 101-129.
- Oettingen, G., Mayer, D., & Thorpe, J. (2010). Self-regulation of commitment to reduce cigarette consumption: Mental contrasting of future with reality. *Psychology and Health, 25*, 961-977.
- Oettingen, G., Pak, H. J., & Schnetter, K. (2001). Self-regulation of goal-setting: Turning free fantasies about the future into binding goals. *Journal of Personality and Social Psychology, 80*, 736-753.
- Ouellette, J. A., Hessling, R., Gibbons, F. X., Reis-Bergan, M., & Gerrard, M. (2005). Using images to increase exercise behavior: Prototypes versus possible selves. *Personality and Social Psychology Bulletin, 31*(5), 610-620.

- Oyserman, D., Bybee, D., Terry, K., & Hart-Johnson, T. (2004). Possible selves as roadmaps. *Journal of Research in Personality, 38*(2), 130-149.
- Oyserman, D., & Markus, H. R. (1990). Possible selves and delinquency. *Journal of Personality and Social Psychology, 59*(1), 112-125.
- Petry, N. M. (2005). *Pathological gambling: Etiology, comorbidity, and treatment*. American Psychological Association.
- Petry, N. M., & Armentano, C. (1999). Prevalence, assessment, and treatment of pathological gambling: A review. *Psychiatric Services, 50*, 1021-1027.
- Petry, N. M., Ginley, M. K., & Rash, C. J. (2017). A systematic review of treatments for problem gambling. *Psychology of Addictive Behaviors, 31*(8), 951-961.
- Pirlott, A. G., & MacKinnon, D. P. (2016). Design approaches to experimental mediation. *Journal of Experimental Social Psychology, 66*, 29-38.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717-731.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: applications to addictive behaviors. *American Psychologist, 47*(9), 1102-1114.
- Przepiorka, A., & Blachnio, A. (2016). Time perspective in Internet and Facebook addiction. *Computers in Human Behavior, 60*, 13-18.
- Pulford, J., Bellringer, M., Abbott, M., Clarke, D., Hodgins, D., & Williams, J. (2009). Barriers to help seeking for a gambling problem: The experiences of gamblers who have sought specialist assistance and the perceptions of those who have not. *Journal of Gambling Studies, 25*, 33-48.

Qualtrics. (2022, March 18). *Bot Detection*. Qualtrics XM. Retrieved from:

<https://www.qualtrics.com/support/survey-platform/survey-module/survey-checker/fraud-detection/>

Quilty, L. C., Wardell, J. D., Thiruchselvam, T., Keough, M. T., & Hendershot, C. S.

(2019). Brief interventions for problem gambling: A meta-analysis. *PLoS One*, *14*(4), e0214502.

Raylu, N., Oei, T. P., & Loo, J. (2008). The current status and future direction of self-help treatments for problem gamblers. *Clinical Psychology Review*, *28*, 1372-1385.

Reith, G., & Dobbie, F. (2012). Lost in the game: Narratives of addiction and identity in recovery from problem gambling. *Addiction Research & Theory*, *20*(6), 511-521.

Roberts, A., Sharman, S., Coid, J., Murphy, R., Bowden-Jones, H., Cowlshaw, S., & Landon, J. (2017). Gambling and negative life events in a nationally representative sample of UK men. *Addictive Behaviors*, *75*, 95-102.

Rollnick, S., & Miller, W. R. (1995). What is motivational interviewing?. *Behavioural and Cognitive Psychotherapy*, *23*(4), 325-334.

Rollnick, S., Miller, W., & Butler, C. (2008). *Motivational interviewing in health care: Helping patients change behavior*. New York: Guilford Press.

Rosengren, D. B. (2009). *Building motivational interviewing skills: A practitioner workbook*. Guilford Press.

Ross, M., & Wilson, A. E. (2002). It feels like yesterday: self-esteem, valence of personal past experiences, and judgments of subjective distance. *Journal of Personality and Social Psychology*, *82*(5), 792-803.

Routledge, C., Arndt, J., Sedikides, C., & Wildschut, T. (2008). A blast from the past:

The terror management function of nostalgia. *Journal of Experimental Social Psychology*, 44(1), 132-140.

Routledge, C., Arndt, J., Wildschut, T., Sedikides, C., Hart, C. M., Juhl, J., & Schlotz, W. (2011). The past makes the present meaningful: Nostalgia as an existential resource. *Journal of Personality and Social Psychology*, 101, 638-652.

Routledge, C., Wildschut, T., Sedikides, C., & Juhl, J. (2013). Nostalgia as a resource for psychological health and well-being. *Social and Personality Psychology Compass*, 7(11), 808-818.

Russell, A. M., Browne, M., Hing, N., Visintin, T., Begg, S., Rawat, V., & Rockloff, M. (2021). Stressful life events precede gambling problems, and continued gambling problems exacerbate stressful life events; a life course calendar study. *Journal of Gambling Studies*, 1-26.

Salmon, M. M., Hollingshead, S. J., Paynter, A. A., Tabri., N., Goldstein, A., & Wohl, M. J. A. (2017). *Overcoming barriers to change via reflecting on the positive past: A rapid evidence assessment*. [Report]. Guelph, ON: Gambling Research Exchange Ontario.

Salmon, M., Kim, H. S., & Wohl, M. J. (2018). In the Mindset for Change: Self-Reported Quit Attempts are a Product of Discontinuity-Induced Nostalgia and Incremental Beliefs. *Journal of Social and Clinical Psychology*, 37, 405-430.

Salmon, M. M., & Wohl, M. J. (2020). Longing for the past and longing for the future: A phenomenological assessment of the relation between temporal focus and readiness to change among people living with addiction. *Frontiers in Psychology*, 11, 1794.

- Sani, F. (Ed.) (2008). *Self continuity: Individual and collective perspectives*. New York, NY: Psychology Press.
- Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: the prospective brain. *Nature Reviews Neuroscience*, 8(9), 657-661.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, 67(6), 1063-1078.
- Schmider, E., Ziegler, M., Danay, E., Beyer, L., & Bühner, M. (2010). Is it really robust? Reinvestigating the robustness of ANOVA against violations of the normal distribution assumption. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, 6(4), 147-151.
- Sedikides, C., & Wildschut, T. (2016). Past forward: Nostalgia as a motivational force. *Trends in Cognitive Sciences*, 20, 319-321.
- Sedikides, C., & Wildschut, T. (2020). The motivational potency of nostalgia: The future is called yesterday. In *Advances in motivation science* (Vol. 7, pp. 75-111). Elsevier.
- Sedikides, C., Wildschut, T., Gaertner, L., Routledge, C., & Arndt, J. (2008). Nostalgia as enabler of self-continuity. In F. Sani (Ed.), *Self-continuity: Individual and collective perspectives* (pp. 227–239). New York: Psychology Press.
- Sedikides, C., Wildschut, T., Routledge, C., & Arndt, J. (2015). Nostalgia counteracts self-discontinuity and restores self-continuity. *European Journal of Social Psychology*, 45, 52-61.
- Sedikides, C., Wildschut, T., Routledge, C., Arndt, J., & Zhou, X. (2009). Buffering acculturative stress and facilitating cultural adaptation: Nostalgia as a

- psychological resource. In R. S. Wyer, Jr., C.-Y. Chiu, & Y.-Y. Hon (Eds.), *Understanding culture: Theory, research, and application* (pp. 361–378). New York: Psychology Press.
- Shaffer, H. J. (1994). Denial, ambivalence and countertransference hate. *Alcoholism: Dynamics and Treatment*, 421-437.
- Shaffer, H. J., & Simoneau, G. (2001). Reducing resistance and denial by exercising ambivalence during the treatment of addiction. *Journal of Substance Abuse Treatment*, 20(1), 99-105.
- Sheehan, K. B. (2018). Crowdsourcing research: data collection with Amazon's Mechanical Turk. *Communication Monographs*, 85(1), 140-156.
- Slutske, W. S. (2006). Natural recovery and treatment-seeking in pathological gambling: Results of two US national surveys. *American Journal of Psychiatry*, 163, 297-302.
- Slutske, W. S., Blaszczyński, A., & Martin, N. G. (2009). Sex differences in the rates of recovery, treatment-seeking, and natural recovery in pathological gambling: results from an Australian community-based twin survey. *Twin Research and Human Genetics*, 12(5), 425-432.
- Smollan, R. K. (2006). Minds, hearts and deeds: Cognitive, affective and behavioural responses to change. *Journal of Change Management*, 6(2), 143-158.
- Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, 89(6), 845-851.

- Stephan, E., Wildschut, T., Sedikides, C., Zhou, X., He, W., Routledge, C., Cheung, W-Y, & Vingerhoets, A. J. (2014). The mnemonic mover: Nostalgia regulates avoidance and approach motivation. *Emotion, 14*, 545-561.
- Stewart, S. H., & Zack, M. (2008). Development and psychometric evaluation of a three-dimensional Gambling Motives Questionnaire. *Addiction, 103*, 1110-1117.
- Stone-Romero, E. F., & Rosopa, P. J. (2008). The relative validity of inferences about mediation as a function of research design characteristics. *Organizational Research Methods, 11*(2), 326-352.
- Stucki, S., & Rihs-Middel, M. (2007). Prevalence of adult problem and pathological gambling between 2000 and 2005: An update. *Journal of Gambling Studies, 23*(3), 245-257.
- Suurvali, H., Hodgins, D., Toneatto, T., & Cunningham, J. (2008). Treatment seeking among Ontario problem gamblers: Results of a population survey. *Psychiatric Services, 59*(11), 1343-1346.
- Swan, J. L., & Hodgins, D. C. (2015). Brief interventions for disordered gambling. *Canadian Journal of Addiction, 6*(2), 29-36.
- Tamasauskas, D., Sakalauskas, V., & Kriksciuniene, D. (2012, December). Evaluation framework of hierarchical clustering methods for binary data. In *2012 12th International Conference on Hybrid Intelligent Systems (HIS)* (pp. 421-426). IEEE.
- Tavares, H., Martins, S., Zilberman, M. L., & el-Guebaly, N. (2002). Gamblers seeking treatment: Why haven't they come earlier? *Addictive Disorders & Their Treatment, 1*, 65-69.

- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the positive and negative affect schedule (PANAS). *Journal of Cross-Cultural Psychology, 38*(2), 227-242.
- Toce-Gerstein, M., Gerstein, D. R., & Volberg, R. A. (2009). The NODS–CLiP: A rapid screen for adult pathological and problem gambling. *Journal of Gambling Studies, 25*(4), 541-555.
- Toneatto, T. (1999). Cognitive psychopathology of problem gambling. *Substance Use & Misuse, 34*(11), 1593-1604.
- Toneatto, T., Cunningham, J., Hodgins, D., Adams, M., Turner, N., & Koski-Jannes, A. (2008). Recovery from problem gambling without formal treatment. *Addiction Research & Theory, 16*, 111–120.
- Van Calster, K., Lens, W., & Nuttin, J. R. (1987). Affective attitude toward the personal future: Impact on motivation in high school boys. *The American Journal of Psychology, 1*-13.
- Van Cappellen, P., Rice, E. L., Catalino, L. I., & Fredrickson, B. L. (2018). Positive affective processes underlie positive health behaviour change. *Psychology & Health, 33*(1), 77-97.
- Van Gelder, J. L., Luciano, E. C., Weulen Kranenbarg, M., & Hershfield, H. E. (2015). Friends with my future self: Longitudinal vividness intervention reduces delinquency. *Criminology, 53*(2), 158-179.
- vanDellen, M. R., & Hoyle, R. H. (2008). Possible selves as behavioral standards in self-regulation. *Self and Identity, 7*(3), 295-304.

- Vartanian, L. R., Chen, W. H., Reily, N. M., & Castel, A. D. (2016). The parallel impact of episodic memory and episodic future thinking on food intake. *Appetite*, 101, 31-36.
- Velicer, W. F., DiClemente, C. C., Prochaska, J. O., & Brandenburg, N. (1985). Decisional balance measure for assessing and predicting smoking status. *Journal of Personality and Social Psychology*, 48(5), 1279-1289.
- Vess, M., Arndt, J., Routledge, C., Sedikides, C., & Wildschut, T. (2012). Nostalgia as a resource for the self. *Self and Identity*, 11, 273-284.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132(2), 249-268.
- Wildschut, T., Sedikides, C., Arndt, J., & Routledge, C. (2006). Nostalgia: Content, triggers, functions. *Journal of Personality and Social Psychology*, 91, 975-993.
- Wills, T. A., Sandy, J. M., & Yaeger, A. M. (2001). Time perspective and early-onset substance use: A model based on stress-coping theory. *Psychology of Addictive Behaviors*, 15(2), 118-125.
- Wohl, M. J. A., Kim, H. S., Salmon, M., Santesso, D., Wildschut, T., & Sedikides, C. (2018). Discontinuity-induced nostalgia improves the odds of a self-reported quit attempt among people living with addiction. *Journal of Experimental Social Psychology*, 75, 83-94.
- Wohl, M. J. A., & Salmon, M. (2016, October). *The bright side of the road: Research in focus*. Invited talk at the Hamilton Alcohol, Drug, & Gambling Services, Hamilton, ON.

- Wohl, M. J., Young, M. M., & Hart, K. E. (2005). Untreated young gamblers with game-specific problems: Self-concept involving luck, gambling ecology and delay in seeking professional treatment. *Addiction Research & Theory, 13*(5), 445-459.
- Wohl, M. J., Young, M. M., & Hart, K. E. (2007). Self-perceptions of dispositional luck: Relationship to DSM gambling symptoms, subjective enjoyment of gambling and treatment readiness. *Substance Use & Misuse, 42*(1), 43-63.
- Wood, R. T., & Griffiths, M. D. (2007). A qualitative investigation of problem gambling as an escape-based coping strategy. *Psychology and Psychotherapy: Theory, Research and Practice, 80*(1), 107-125.
- Wulfert, E., Blanchard, E. B., Freidenberg, B. M., & Martell, R. S. (2006). Retaining pathological gamblers in cognitive behavior therapy through motivational enhancement: A pilot study. *Behavior Modification, 30*(3), 315-340.
- Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology, 77*, 1271-1288.
- Zimbardo, P. G., & Boyd, J. N. (2006). Time perspective, health, and risk taking. In A. Strathman & J. Joireman (Eds.) *Understanding behavior in the context of time* (pp. 97-119). New York: Psychology Press.
- Zimbardo, P., & Boyd, J. (2008). *The time paradox: The new psychology of time that will change your life*. New York: Free Press.
- Zimbardo, P. G., & Boyd, J. N. (2015). Putting time in perspective: A valid, reliable individual-differences metric. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.) *Time perspective theory; review, research and application* (pp. 17-55). Springer.

## List of Tables

Table 1

*Demographic Items among Participants in each Condition in Study 1*

	Past		Future		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age <sup>1</sup>	35.65	(11.08)	32.23	(8.51)	34.09	(10.05)
Gender						
Male	16	51.6%	15	57.7%	31	54.4%
Female	15	48.4%	11	42.3%	26	45.6%
PGSI Category						
Moderate-risk gambler	5	16.1%	3	11.5%	8	14.0%
High-risk gambler	26	83.9%	23	88.5%	49	89.0%
Gambling Frequency						
More than once every 3 months	2	6.5%	9	0.0%	2	3.5%
More than once a month	7	22.6%	8	30.8%	15	36.3%
More than once a week	18	58.1%	14	53.8%	32	56.1%
More than once a day	4	12.9%	4	15.4%	8	14.0%
Previous Change Attempt						
Yes	21	67.7%	12	46.2%	33	57.9%
No	10	32.3%	14	53.8%	24	42.1%

*Note:* No significant differences between conditions on demographic items ( $p > .05$ ).

<sup>1</sup>Mean age and standard deviation reported.

Table 2

*Proportion of Cluster Members Expressing each Constituent in each of the Two Clusters in the Past Condition in Study 1*

Constituent	Cluster	
	I	II
C1. My life was more positive before gambling became problematic	0.75*	0.00
C2. I had better social connections before my gambling became problematic	0.95*	0.18
C3. I was involved in more meaningful activities before my gambling became problematic	0.80*	0.27
C4. I was a better person before my gambling became problematic	0.45*	0.09
C5. Gambling took over my life (themes of discontinuity)	0.30*	0.00
C6. Gambling has not changed the quality of my life (or my social connections)	0.00	0.73*
C7. Parts of my past were positive and parts of my past were negative (mixed bag)	0.00	0.36*
C8. There was a pivotal (traumatic) event that triggered my gambling	0.00	0.27*
C9. I will not change my gambling behaviour	0.00	0.45*
C10. I was happier before my gambling became problematic	0.35	0.09
C11. My financial situation was better before my gambling became problematic	0.60	0.27

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C12. I am resistant to changing my gambling behaviour	0.25	0.09
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*Note:* \*More frequently present than in the other cluster,  $p < .05$

Table 3

*Past Perception Ratings between Clusters in Study 1*

Item	Cluster I		Cluster II		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
The life I lived before my gambling became problematic is vivid in my mind.	5.55	1.23	5.09	2.12	0.59	.45
The life I lived before my gambling became problematic is vague in my mind.	2.55	1.64	2.73	1.85	0.08	.79
I long for the life I lived without problematic gambling.	5.60	1.23	3.27	1.90	17.15	< .001
When gambling wasn't problematic, I felt safe and secure in my life.	5.95	1.00	3.55	1.86	22.17	< .001
It makes me feel anxious to think about the life I lived without gambling.	4.10	2.02	3.73	2.33	0.22	.65
The life I lived before I started gambling problematically was full of meaning.	5.65	1.04	3.27	1.90	20.50	< .001
Before my gambling became problematic, I felt more love in my life.	5.80	1.06	3.18	1.78	26.70	< .001

Table 4

*Proportion of Cluster Members Expressing each Constituent in each of the Two Clusters in the Future Condition in Study 1*

Constituent	Cluster	
	I	II
C1. I will be happier when my gambling is no longer problematic	0.73*	0.07
C2. My finances will be better after my gambling is no longer problematic	1.00*	0.33
C3. I will engage in more meaningful activities after my gambling is no longer problematic	1.00*	0.47
C4. Parts of my life will be better, parts of my life will stay the same, and parts of my life will be worse (mixed bag)	0.00	0.73*
C5. I am resistant to changing my gambling behaviour	0.27	0.67*
C6. My social connections will be better after my gambling is no longer problematic	0.91	0.60
C7. My life will be more positive when my gambling is no longer problematic	0.55	0.20
C8. I will be a better person when my gambling is no longer problematic	0.46	0.13
C9. Mention of a new beginning	0.55	0.27
C10. I will not change my gambling behaviour	0.00	0.27
C11. My future without gambling is vague/uncertain	0.09	0.20

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C12. My life would have been hypothetically better if I hadn't gambled (expression of upward counterfactual)	0.09	0.13
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*Note:* \*More frequently present than in the other cluster,  $p < .05$

Table 5

*Future Perception Ratings between Clusters in Study 1*

Item	Cluster I		Cluster II		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
The life I would live after my gambling is no longer problematic is vivid in my mind.	6.00	0.78	4.47	1.46	10.02	.004
The life I would live after my gambling is no longer problematic is vague in my mind.	2.45	1.67	4.27	2.09	5.58	.03
I long for the life I would live without problem gambling.	6.09	1.22	4.47	1.69	7.35	.01
When my gambling is no longer problematic, I will feel safe and secure in my life.	6.09	0.83	4.67	1.72	6.40	.02
It makes me feel anxious to think about the life I would live without gambling.	3.45	2.30	4.40	1.72	1.44	.24
The life I would live after I stop gambling problematically will be full of meaning.	6.27	0.91	5.33	1.18	4.89	.04

---

After my gambling is no longer	5.82	1.25	4.53	1.73	4.38	.05
--------------------------------	------	------	------	------	------	-----

problematic, I will feel more

love in my life.

---

Table 6

*Means, Standard Deviations, and Correlations between the Variables of Interest in Study 2*

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.
1. Past Perceptions	-0.15	1.51	-				
2. Nostalgia	4.32	1.41	.35**	-			
3. Future Perceptions	0.41	1.10	.38**	.31**	-		
4. Longing for the Future	5.11	1.24	.26**	.61**	.50**	-	
5. Readiness to Change	6.68	2.24	.18*	.19*	.42**	.43**	-
6. Problem Gambling Severity	13.83	5.33	.04	.35**	.20*	.31**	.07

*Note:* \*  $p < .01$ , \*\*  $p < .001$

Table 7

*Means and Standard Deviations of Dependent Measures by Condition in Study 3*

	Positive Past		Ordinary Past		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Past Perceptions	0.02	1.47	0.12	1.59	0.28	.59
Nostalgia	5.00	1.31	4.55	1.31	8.23	.004
Readiness to Change	6.35	2.21	6.40	2.22	0.03	.86
Problem Gambling Severity	14.61	5.21	15.08	5.67	0.51	.48

Table 8

*Correlations between Dependent Measured Variables in Each Condition in Study 3*

	1.	2.	3.
<b>Positive Past Condition</b>			
1. Past Perceptions	-		
2. Nostalgia	.41**	-	
3. Readiness to Change	.21*	.27*	-
4. Problem Gambling Severity	.25*	.37**	.10
<b>Ordinary Past Condition</b>			
1. Past Perceptions	-		
2. Nostalgia	.41**	-	
3. Readiness to Change	.20*	.25*	-
4. Problem Gambling Severity	-.04	.33**	.14

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

Table 9

*Means and Standard Deviations of Dependent Measures by Condition in Study 4*

	Positive Future		Ordinary Future		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Future Perceptions	0.09	0.99	0.00	1.27	0.30	.48
Longing for Future	5.33	1.05	4.96	1.27	4.34	.04
Readiness to Change	6.82	1.91	5.92	2.16	8.41	.004
Problem Gambling Severity	14.74	5.65	14.19	6.17	0.38	.54

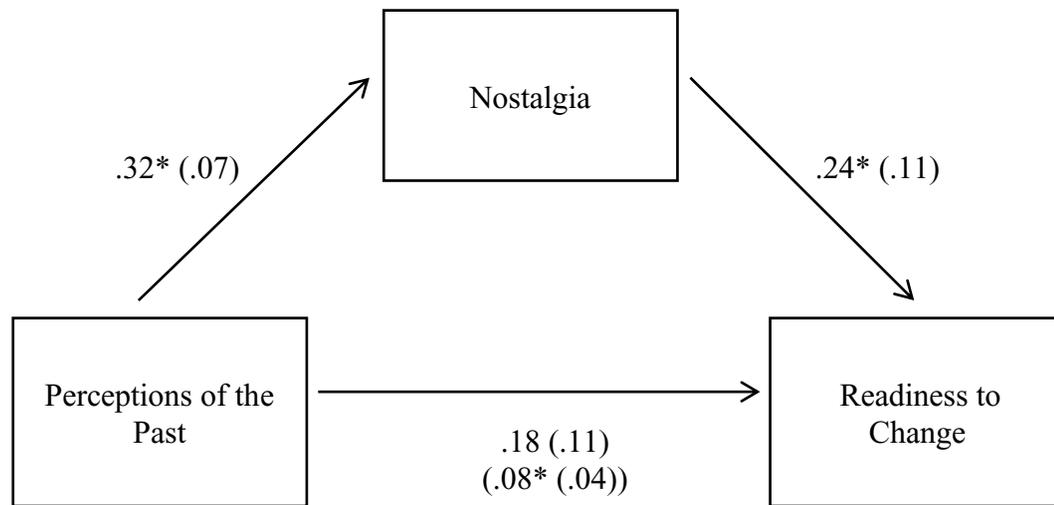
Table 10

*Correlations between Dependent Measured Variables in Each Condition in Study 4*

	1.	2.	3.
<b>Positive Future Condition</b>			
1. Future Perceptions	-		
2. Longing for Future	.38**	-	
3. Readiness to Change	.36**	.41**	-
4. Problem Gambling Severity	-.002	.26*	.31*
<b>Ordinary Future Condition</b>			
1. Future Perceptions	-		
2. Longing for Future	.57**	-	
3. Readiness to Change	.43**	.25*	-
4. Problem Gambling Severity	.06	.33**	.14

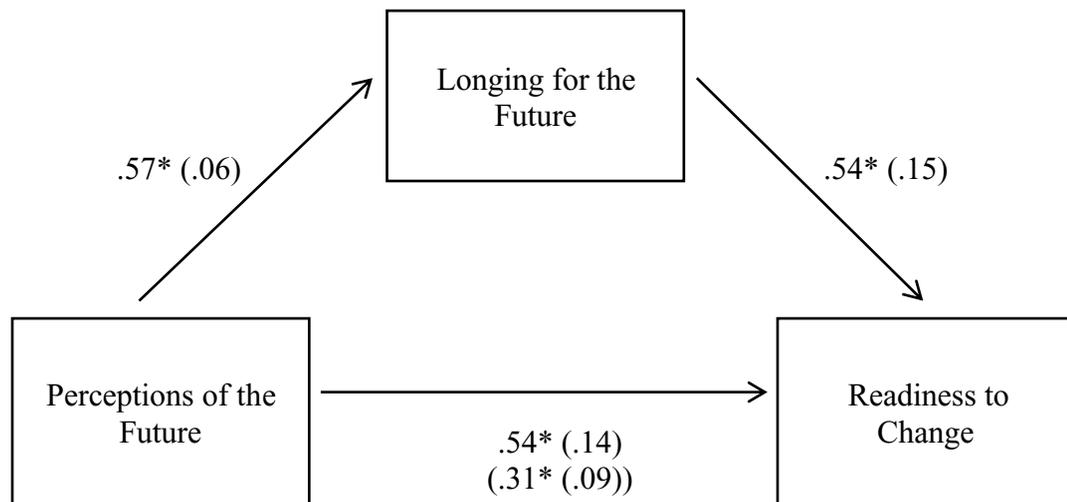
*Note:* \*  $p < .05$ , \*\*  $p < .001$

## List of Figures



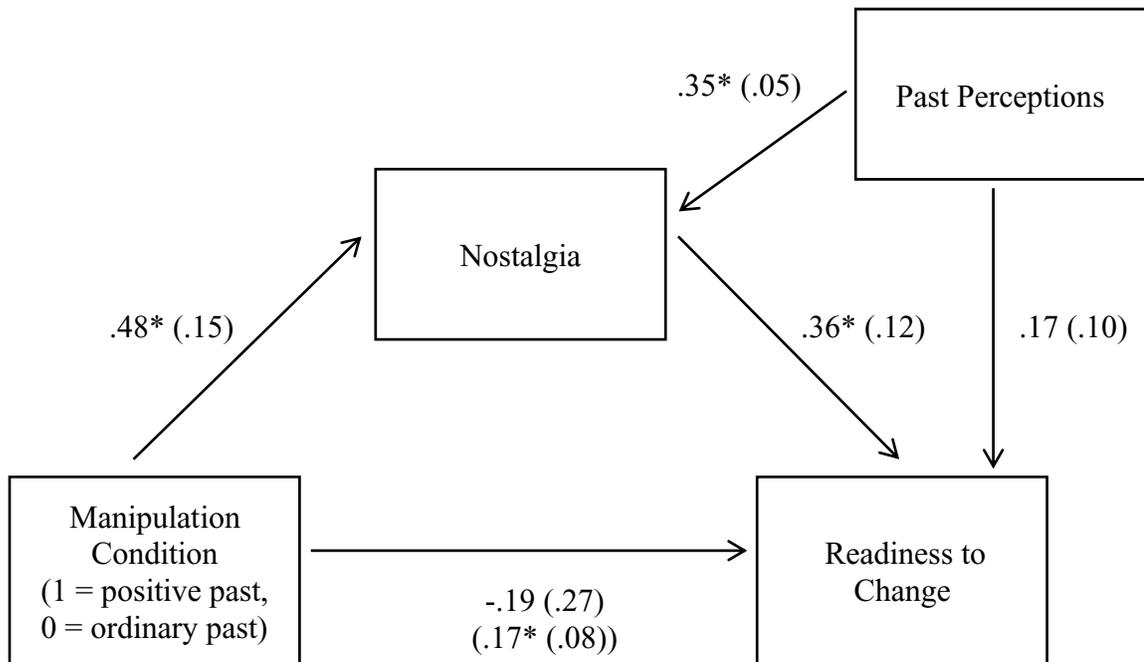
Note: \*  $p < .05$

Figure 1. Study 2: Mediation model demonstrating the indirect effect of perceptions of the past on readiness to change via nostalgia for the pre-addicted past. The regression coefficient for the indirect effect is in parentheses below the coefficient for the direct effect of perceptions of the past on readiness to change, controlling for nostalgia.



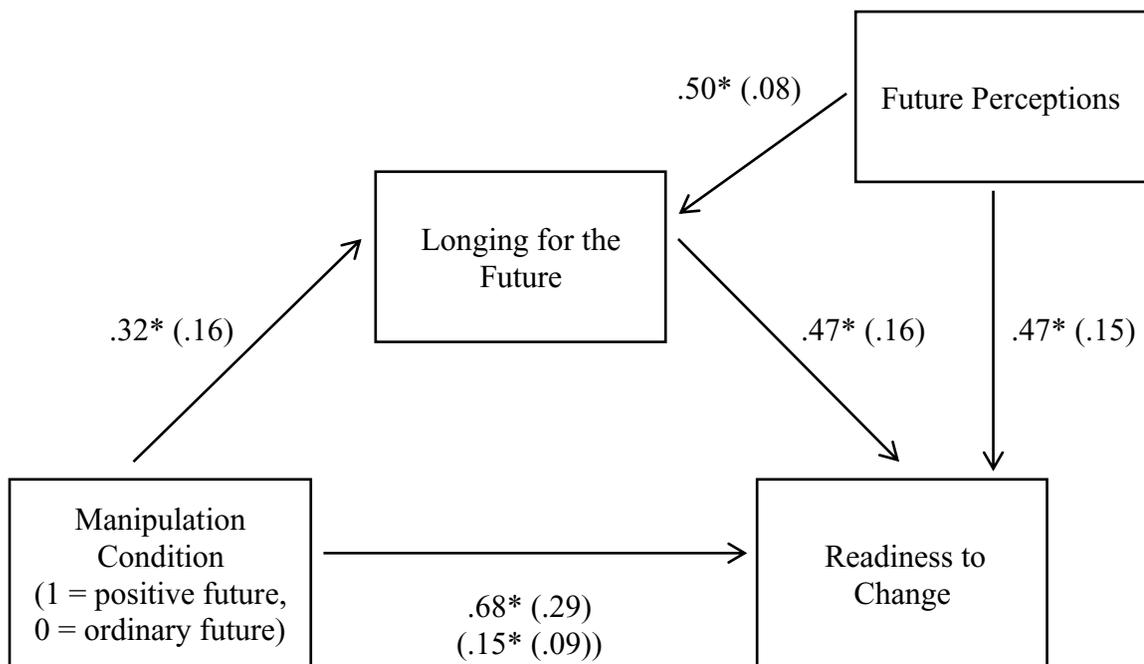
Note: \*  $p < .05$

Figure 2. Study 2: Mediation model demonstrating the indirect effect of perceptions of the future on readiness to change via longing for a future without gambling. The regression coefficient for the indirect effect is in parentheses below the coefficient for the direct effect of perceptions of the future on readiness to change, controlling for longing for the future.



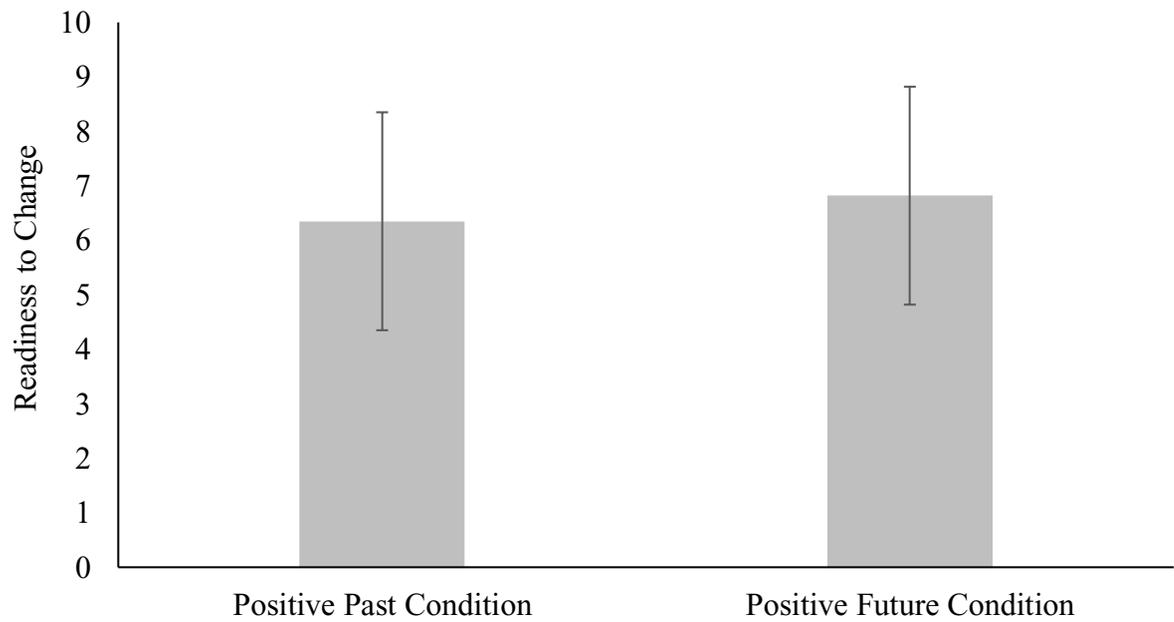
Note:  $*p < .05$

Figure 3. Study 3: Experimental mediation model demonstrating the indirect effect of the positive past manipulation on readiness to change via nostalgia for the pre-addicted past, controlling for pre-existing perceptions of the pre-addicted past. The regression coefficient for the indirect effect is in parentheses below the coefficient for the direct effect of the manipulation on readiness to change, controlling for nostalgia and perceptions of the past.

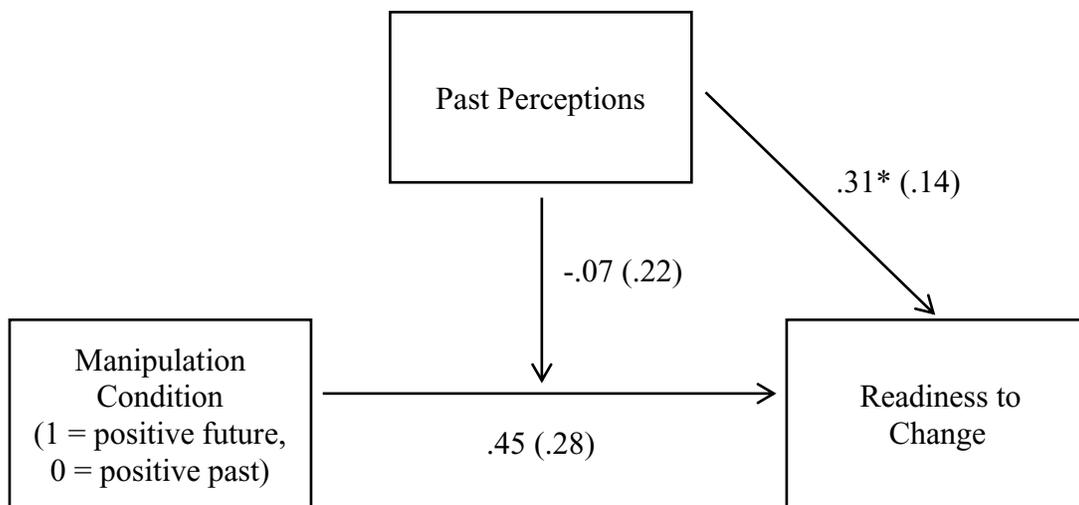


Note: \*  $p < .05$

Figure 4. Study 4: Experimental mediation model demonstrating the indirect effect of the positive future manipulation on readiness to change via longing for a future without gambling, controlling for pre-existing perceptions of the future without gambling. The regression coefficient for the indirect effect is in parentheses below the coefficient for the direct effect of the manipulation on readiness to change, controlling for longing and perceptions of the future.

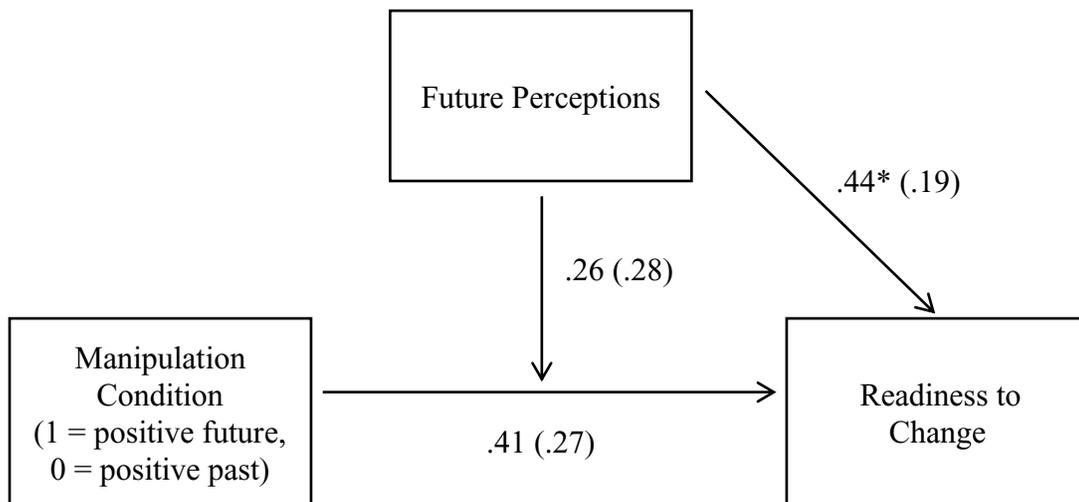


*Figure 5.* Integrated data analysis: Readiness to change scores for gamblers in both the positive past condition and the positive future condition. No significant difference was observed between conditions.



Note: \*  $p < .05$

Figure 6. Integrated data analysis: Moderation model demonstrating the non-significant interaction between the positive manipulation conditions and perceptions of the past on readiness to change.



Note: \*  $p < .05$

Figure 7. Integrated data analysis: Moderation model demonstrating the non-significant interaction between the positive manipulation conditions and perceptions of the future on readiness to change.

## **Appendix A: Study 1 Recruitment Notice**

### **Your Gambling, Your Story (30 mins/\$3.00)**

We want to hear your story about your problems with gambling. As such, we will ask you to **write several paragraphs** that detail who you are in relation to your gambling.

Because of the focus of this study, we are recruiting **ONLY**:

- People who gamble
- People who think they have problems with gambling
- People who are NOT in treatment for gambling problems

In this study, you will be asked to write about how you think about yourself in relation to your gambling. We will also ask you a few questions about your gambling (when and why you gamble) and your thoughts about changing your gambling.

Your participation as well as your responses will be strictly confidential. Only researchers associated with the project will know you participated in the study and no one will know how you responded to the questions asked.

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 behaviour. In the event you feel anxiety or distress, information will be provided linking you to appropriate health services in your local area.

NOTE: In addition to better understanding the self in relation to gambling, this research will be the foundation of my PhD dissertation. Therefore, I encourage you to only sign up if you are willing to provide good quality responses. Thank you!

### **Eligibility Requirements:**

1. Must be a resident of the United States
2. Must have spent at least \$100 on gambling activities in the past 12 months (e.g., poker, blackjack, roulette, slot machine, sports betting, etc.).
3. Must think that you have problems with your gambling (e.g., spend too much time or money gambling).
4. Must not be in treatment for your problems with gambling.

This study takes about 30 minutes, and upon completion you will receive US \$3.00 for your participation.

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This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

## Appendix B: Study 1 Informed Consent

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 #108822). Ethics expiration date: 31 March 2019.

**Eligibility:** All participants must: 1) be a resident of the United States, and 2) have spent at least \$100 on gambling activities in the past 12 months, 3) think that you have problems with gambling, and 4) not be in treatment for your problems with gambling.

Please note that you will be assessed on your eligibility to participate immediately following this consent form. Only eligible participants will be permitted to participate in the survey and receive compensation.

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**Present study:** Your Gambling, Your Story

**Research Personnel:** The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Melissa Salmon (Principal Investigator, [melissasalmon@cmail.carleton.ca](mailto:melissasalmon@cmail.carleton.ca), (613) 520-2600 ext. 6312), Dr. Michael Wohl (Faculty Investigator, [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca), (613) 520-2600 ext. 2908), or Amanda Feige (Other Research Personnel, [amanda.feige@carleton.ca](mailto:amanda.feige@carleton.ca), (613) 520-2600 ext. 2683).

Should you have any ethical concerns about this research, please contact Dr. Bernadette Campbell, (613) 520-2600 ext. 4085 (Carleton University Research Ethics Board-B Chair) or the Carleton University Ethics Board ([ethics@carleton.ca](mailto:ethics@carleton.ca)).

**Purpose:** The purpose of this study is to understand how people think about themselves in relation to their gambling.

**Task Requirements:** You will be asked to write about how you think about yourself in relation to your gambling. We will also ask you a few questions about your gambling (when and why you gamble) and your thoughts about changing your gambling.

**Benefits/Compensation:** We are offering eligible participants who complete the study US \$3.00 for participating.

**Duration and Locale:** The survey will be administered online and should take approximately 30 minutes to complete. Be assured that your name will not be associated in any way with the research findings.

**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 not to complete certain questions or to withdraw with no penalty whatsoever. This study is completely anonymous and as such, the researchers will have no way of identifying your responses. Because of this, the researchers will not be able to delete your data upon request. We anticipate the study will be complete by March 31, 2019.

To withdraw at any point, simply click the “proceed” until you reach the debriefing page.

**Anonymity/Confidentiality:** Your participation in this study is anonymous. No identifying information (e.g., name, IP address) will be collected as part of your participation in this study. Although you have been recruited to participate in this study through MTurk, all of your responses and data will be recorded on Qualtrics (and none of your responses will be stored on MTurk). All data on the Qualtrics server is encrypted and protected using multiple layers of security (e.g., encrypted websites and password protected storage). For more information about the security of data on Qualtrics, please see the Qualtrics security and privacy policy, which can be found at the following link: <http://www.qualtrics.com/security-statement>.

Study data will be secured by Qualtrics in the United States; however, it may be disclosed due to a court order or data breach. 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.

**Data Storing and Sharing:** The data will be stored on the 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 dataset to an online data repository called Open Science Framework (<http://osf.io/>) for research and teaching purposes. Anonymized data may be shared with trusted colleagues.

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Do you agree to participate in this study?

- Yes.
- No.

### Appendix C: Study 1 Eligibility Criteria

1. Over the last 12 months, have you spent more than \$100 on any kinds of gambling activities put together?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)
2. Do you think you have a gambling problem?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)
3. Have you ever or are you currently seeking treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)

*[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.]*

4. 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
5. Have you ever tried to stop, cut down, or control your gambling?
  - a. Yes
  - b. No
6. 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
7. 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: Study 1 Ineligibility Debriefing**

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 about this, you can contact Melissa Salmon at [melissasalmon@email.carleton.ca](mailto:melissasalmon@email.carleton.ca) or 613-520-2600 ext. 6312.

## Appendix E: Study 1 Measures

### Demographics and Gambling Behaviour

1. What is your age? \_\_\_\_\_
2. What is your gender?
  - a. Male
  - b. Female
  - c. Other: \_\_\_\_\_
3. What age did you first start gambling? \_\_\_\_\_
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. Roughly how much money have you spent on gambling in the last 3 months?  
\$ \_\_\_\_\_
6. Roughly how much time have you spent on gambling in the last 3 months?  
\_\_\_\_\_ hours
7. I think I gamble a lot.
  - a. Strongly Disagree
  - b. Disagree
  - c. Neither Agree nor Disagree
  - d. Agree
  - e. Strongly Agree
8. What types of gambling games do you prefer?
  - a. I prefer skill-based games (e.g., poker)
  - b. I prefer chance-based games (e.g., slot machines)
  - c. No preference

## Preface

In the following section, we will ask you reflect and write about your thoughts, feelings, and experiences with gambling. Please read the instructions carefully and provide honest responses.

It is important that you don't speed through this section. We understand that Workers like to complete each HIT as quickly as possible. We ask that you slow that desire down and really think about your answers. We have allocated a specified amount of time for each of the following writing task. To compensate you for this time, we are giving Workers \$3 to complete this HIT.

Because this is an important part of the survey, we have embedded a clock so we can tell how long Workers spend on this writing task.

\*\*This research will be the foundation of a PhD student's (Ms. Salmon) dissertation. It would mean a lot if you read the instructions carefully and provided a thoughtful response. Thank you!

## Gambling Influence

Please take some time to think about how gambling has influenced your life. Using the space below, please write about a **particular experience or event that best represents how gambling has influenced your life.**

Please spend the next 5 minutes writing about this particular experience. What is this experience? Who was involved? What emotions did you feel? Be as vivid and descriptive as you can be.

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**Condition: A Past without Gambling**

Please take some time to think about what your life was like **before your gambling became problematic**. Bring this life you lived to mind and think it through.

Please spend the next 10 minutes writing about what your life was like before your gambling became problematic. What filled your days? What were your relationships with others like? What were you like?

Your description should be at least one paragraph in length (approximately 100 words). Be as vivid and descriptive as you can be.

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*[page break]*

How much time did you spend writing? \_\_\_\_\_ minutes

If there is anything more you would like to add to your story, please write it here:

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*[page break]*

**Please keep in mind what your life was like before your gambling became problematic.**

1. The life I lived before my gambling became problematic is vivid (i.e., clear) in my mind.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. The life I lived before my gambling became problematic is vague (i.e., fuzzy) in my mind.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. I long for the life I lived without problematic gambling.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. When gambling wasn't problematic, I felt safe and secure in my life.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. It makes me feel anxious to think about the life I lived without gambling.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. The life I lived before I started gambling problematically was full of meaning.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. Before my gambling became problematic, I felt more love in my life.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

*[page break]*

What do you long for most when thinking about what your life was like before your gambling became problematic?

Please list as many things as you can think of. They do not have to be in any particular order.

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**Condition: A Future without Gambling**

Please take some time to think about what your life would look like **if you decided to change your problematic gambling**. Bring the life you would live to mind and think it through.

Please spend the next 10 minutes writing about what your life would look like if you decided to change your problematic gambling. What would fill your days? What would your relationships with others be like? What would you be like?

Your description should be at least one paragraph in length (approximately 100 words). Be as vivid and descriptive as you can be.

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*[page break]*

How much time did you spend writing? \_\_\_\_\_ minutes

If there is anything more you would like to add to your story, please write it here:

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*[page break]*

**Please keep in mind what your life would look like if you decided to change your problematic gambling.**

1. The life I would live after my gambling is no longer problematic is vivid (i.e., clear) in my mind.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2. The life I would live after my gambling is no longer problematic is vague (i.e., fuzzy) in my mind.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3. I long for the life I would live without problematic gambling.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4. When my gambling is no longer problematic, I will feel safe and secure in my life.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

5. It makes me feel anxious to think about the life I would live without gambling.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

6. The life I would live after I stop gambling problematically will be full of meaning.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

7. After my gambling is no longer problematic, I will feel more love in my life.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

*[page break]*

What do you long for most when thinking about what your life would look like if you decided to change your problematic gambling?

Please list as many things as you can think of. They do not have to be in any particular order.

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### Readiness to Change (Biener & Abrams, 1991)

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

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

10	Taking action to change (e.g., cutting down, enrolling in a program).
9	
8	Starting to think about how to change my gambling patterns.
7	
6	
5	I think I should change but not quite ready.
4	
3	
2	I think I need to consider changing someday.
1	
0	No thought of changing

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

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

### Behaviour Change

1. Have you ever made an attempt to quit or cut down on your gambling?
  - a. Yes (*if yes, participants complete following item depending on the condition they were assigned to*)
  - b. No (*continue onto next page*)

*[Past condition]*

Please take some time to think about your behaviour change process and how this might be influenced by memories of your life before gambling became problematic.

Please spend the next 5 minutes writing about how memories of your life before gambling became problematic have influenced your attempt to quit or cut down on your gambling. Be as vivid and descriptive as you can be.

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*[Future condition]*

Please take some time to think about your behaviour change process and how this might be influenced by thoughts of what your life would look like without gambling.

Please spend the next 5 minutes writing about how these thoughts of the life you would live without gambling have influenced your attempt to quit or cut down on your gambling. Be as vivid and descriptive as you can be.

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### 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 F: Study 1 Debriefing Form

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

---

**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?

Gambling can develop into an addiction, causing harm to an individual's well-being. Many people who gamble excessively feel that their gambling has fundamentally changed who they are as a person. This often leads people to feel nostalgic (i.e., a sentimental longing) for who they were before gambling entered their life.

Past research has shown that these feelings of nostalgia have powerful motivational properties. To date, nostalgia is associated with positive outcomes such as social connectedness, optimism for the future, positive emotions, meaning in life, empathy, and identity continuity. In a previous study, we found that nostalgia can actually ready people for behaviour change when they are engaging in harmful behaviours. For example, problem gamblers and drinkers who felt nostalgic for their life before they started gambling or drinking were more likely to want to cut down on their addictive behaviours. However, many current treatments for addictive behaviours are future-oriented, asking people to envision a possible future without their addictive behaviour.

In this research, we are trying to determine the content of longing when people think about their past and future selves. That is, we would like to learn more about what kind of memories people bring to mind when they think about their life before gambling problems. In addition, we would like to learn more about what kind of possibilities people bring to mind when they think about their future without gambling problems.

### Why is this important to scientists or the general public?

This research will contribute to psychologists' knowledge and understanding of how gambling relates to one's self-concept. Specifically, findings from this study will shed light on how people think and feel about their life lived before their gambling became problematic, as well as how people think and feel about their possible future life without gambling problems. Behaviour change interventions may be aided by the outcomes of this study.

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

Yes. It is normal to feel some distress or anxiety when thinking about your gambling behaviour. These emotions are sometimes necessary in order to research or study relationships between somewhat sensitive variables. If you are feeling distressed from answering questions about this experience and would like to talk to someone about it, please feel free 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>.

### **What if I have questions later?**

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](mailto:melissa.salmon@carleton.ca)  
 Dr. Michael J. A. Wohl: [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca)  
 Amanda Feige: [amanda.feige@carleton.ca](mailto:amanda.feige@carleton.ca)

Should you have any ethical concerns about this research, please contact Dr. Bernadette Campbell, (613) 520-2600 ext. 4085 (Carleton University Research Ethics Board-B Chair) or the Carleton University Ethics Board ([ethics@carleton.ca](mailto:ethics@carleton.ca)).

### **Where can I get more resources on gambling research?**

If you are interested in learning more about the self-concept and gambling behaviour, please see the following articles:

Kim, H. S., & Wohl, M. J. (2015). The bright side of self-discontinuity: Feeling disconnected with the past self increases readiness to change addictive behaviors (via nostalgia). *Social Psychological and Personality Science*, 6(2), 229-237.

Wohl, M. J., Kim, H. S., Salmon, M., Santesso, D., Wildschut, T., & Sedikides, C. (2018). Discontinuity-induced nostalgia improves the odds of a self-reported quit attempt among people living with addiction. *Journal of Experimental Social Psychology*, 75, 83-94.

If you are interested in additional resources for gambling related resources, The National Center for Responsible Gambling <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 G: Study 2 Recruitment Notice**

### **Gambling and Time (20 mins/\$1.00)**

In this study, you will be asked to answer questions about your gambling and how you think about yourself in relation to your gambling behaviour.

Your participation as well as your responses will be strictly confidential. Only researchers associated with the project will know you participated in the study and no one will know how you responded to the questions asked.

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 behaviour. 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. Must be a resident of the United States
2. Must have spent at least \$100 on gambling activities in the past 12 months (e.g., poker, blackjack, roulette, slot machine, sports betting, etc.).

Please note that you will be assessed on your eligibility to participate before completing the survey. There will be additional eligibility criteria not mentioned in this recruitment notice.

This study takes about 20 minutes, and upon completion you will receive US \$1.00 for your participation.

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This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

## Appendix H: Study 2 Informed Consent Form

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 #108822). Ethics expiration date: 31 March 2021.

**Eligibility:** All participants must: 1) be a resident of the United States and 2) have spent at least \$100 on gambling activities in the past 12 months.

Please note that you will be assessed on your eligibility to participate immediately following this consent form. There will be additional eligibility criteria not mentioned in this recruitment notice. Only eligible participants will be permitted to participate in the survey and receive compensation.

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**Present study:** Gambling and Time

**Research Personnel:** The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Melissa Salmon (Principal Investigator, [melissasalmon@cmail.carleton.ca](mailto:melissasalmon@cmail.carleton.ca), (613) 520-2600 ext. 6312), Julia France (Masters Student, [juliafrance@cmail.carleton.ca](mailto:juliafrance@cmail.carleton.ca)), Dr. Michael Wohl (Faculty Investigator, [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca), (613) 520-2600 ext. 2908), or Mackenzie Dowson (Other Research Personnel, [mackenziedowson@cmail.carleton.ca](mailto:mackenziedowson@cmail.carleton.ca), (613) 520-2600 ext. 2683).

Should you have any ethical concerns about this research, please contact the REB Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085, or by email: [ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researchers.

**Purpose:** The purpose of this study is to understand how people think about themselves in relation to their gambling.

**Task Requirements:** In this study, you will be asked to answer questions about your gambling and how you think about yourself in relation to your gambling behaviour.

**Benefits/Compensation:** We are offering eligible participants who complete the study US \$1.00 for participating.

**Duration and Locale:** The survey will be administered online and should take approximately 20 minutes to complete. Be assured that your name will not be associated in any way with the research findings.

**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 not to complete certain questions or to withdraw with no penalty whatsoever. This study is completely anonymous and as such, the researchers will have no way of identifying your responses. Because of this, the researchers will not be able to delete your data upon request. We anticipate the study will be complete by March 31, 2021.

To withdraw at any point, simply click the “proceed” until you reach the debriefing page.

**Anonymity/Confidentiality:** Your participation in this study is anonymous. No identifying information (e.g., name, IP address) will be collected as part of your participation in this study. Although you have been recruited to participate in this study through MTurk, all of your responses and data will be recorded on Qualtrics (and none of your responses will be stored on MTurk). All data on the Qualtrics server is encrypted and protected using multiple layers of security (e.g., encrypted websites and password protected storage). For more information about the security of data on Qualtrics, please see the Qualtrics security and privacy policy, which can be found at the following link: <http://www.qualtrics.com/security-statement>.

Study data will be stored and protected by Qualtrics in Toronto-based servers. However, it may be disclosed via a court order or data breach. 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.

**Data Storing and Sharing:** The data will be stored on the 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 dataset to an online data repository called Open Science Framework (<http://osf.io/>) for research and teaching purposes. Anonymized data may be shared with trusted colleagues.

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Do you agree to participate in this study?

Yes.

No.

### Appendix I: Study 2 Eligibility Criteria

1. Over the last 12 months, have you spent more than \$100 on any kinds of gambling activities put together?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)
2. Have you quit gambling in the last three months?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)
3. Have you ever sought treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)
4. Are you currently seeking treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)

*[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

*[page break]*

5. Do you think you have a gambling problem?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)

### **Appendix J: Study 2 Ineligibility Debriefing**

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 about this, you can contact Melissa Salmon at [melissasalmon@email.carleton.ca](mailto:melissasalmon@email.carleton.ca) or 613-520-2600 ext. 6312.

**Appendix K: Study 2 Measures****Demographics and Gambling Behaviour**

1. What is your age? \_\_\_\_\_
2. What is your gender?
  - a. Male
  - b. Female
  - c. Other: \_\_\_\_\_
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. Roughly how much money have you spent on gambling in the last 3 months?  
\$ \_\_\_\_\_
5. Roughly how much time have you spent on gambling in the last 3 months?  
\_\_\_\_\_ hours

### Open-Ended Response: Gambling Problems

Please take some time to think about your past and current experiences with gambling.

In the space below, please describe an event that crystallized, in your mind, the idea that you might have a gambling problem.

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### Gambling Motives Questionnaire (Stewart & Zack, 2008)

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.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Almost Never/Never</b>	<b>Sometimes</b>	<b>Often</b>	<b>Almost Always</b>

1. Because you like the feeling (enhancement)
2. Because it's what most of your friends do when you get together (social)
3. To forget your worries (coping)
4. Because it's exciting (enhancement)
5. To be sociable (social)
6. Because you feel more self-confident or sure of yourself (coping)
7. Because it is something you do on special occasions (social)
8. Because it helps when you are feeling nervous or depressed (coping)
9. Because it's fun (enhancement)
10. Because it makes a social gathering more enjoyable (social)
11. To cheer up when you're in a bad mood (coping)
12. Because it makes you feel good (enhancement)
13. Because winning would change your lifestyle (financial)
14. To earn money (financial)
15. To win money (financial)
16. Because you enjoy thinking about what you would do if you won a jackpot (financial)

### Past Preface

In this section, we are going to ask you questions about your life **before** your gambling became problematic. Please take some time to think about your past before answering these questions.

#### Perceptions of Life before Gambling (Adapted from Zimbardo & Boyd, 1999)

Please read each item and indicate the extent to which you agree or disagree using the following scale.

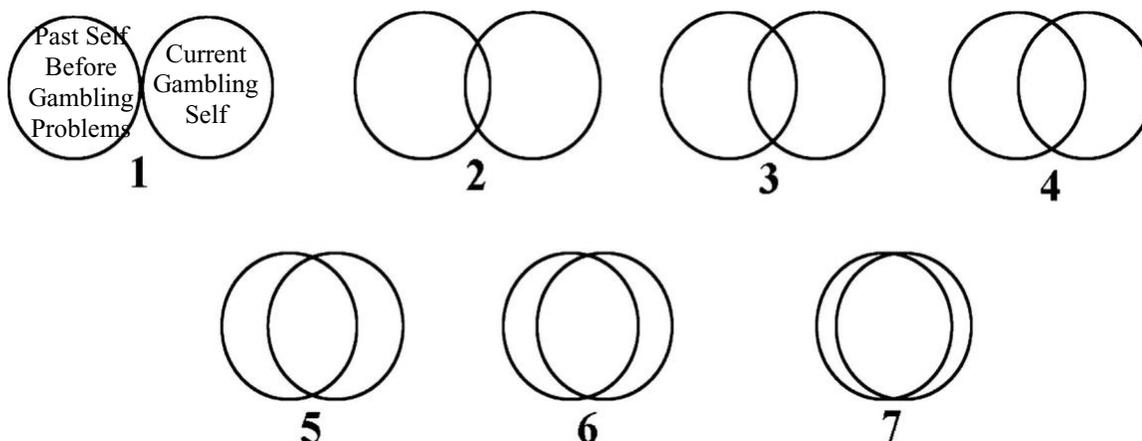
1	2	3	4	5
I disagree a lot	I disagree a little	I neither agree nor disagree	I agree a little	I agree a lot

1. Even before my gambling became problematic, I was unsatisfied with my life. (N)
2. On balance, there is much more good to recall about my life before my gambling became problematic than bad. (P)
3. Even before my gambling became problematic, my life was rather difficult. (N)
4. Positive memories of the life I lived before my gambling became problematic can readily spring to mind. (P)
5. I experienced significant life hardships even before I began gambling problematically. (N)
6. Overall, I would say my life before problem gambling was positive. (P)

#### Past Self-Similarity (Hershfield, 2011)

The following sets of circles show the similarity between the person you were **before your gambling became problematic** and your **current self** (today).

Please select the set of circles that best represents how similar you feel to your past self.



### Self-Discontinuity Scale (Kim & Wohl, 2015)

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
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Somewhat Disagree</b>	<b>Neither Agree or Disagree</b>	<b>Somewhat Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>

1. Gambling problematically has changed who I am.
2. There is a noticeable difference between who I am now and who I was before I started gambling problematically.
3. The person I was before I started gambling problematically is different from the person I am now.
4. When I think about who I am now, it is different from who I was before I started gambling problematically.

### Nostalgia Inventory Scale (Kim & Wohl, 2015)

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
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Somewhat Disagree</b>	<b>Neither Agree or Disagree</b>	<b>Somewhat Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>

1. I am already feeling quite nostalgic about my life before my gambling became problematic.
2. Now that I have started gambling problematically, I miss my previous lifestyle.
3. I long for my life before my gambling became problematic.\*
4. Before I started gambling problematically, I was a better person than I am today.
5. I like the person I was before I started gambling problematically better than the person I am now.

**Negative Life Events Scale (Kowal, Gunthorpe, & Bailie, 2007)**

Have any of the following things been a worry for you or a family member during your life *before (or around the time when) your gambling became problematic?*

0 = no, 1 = yes

1. Serious illness
2. Serious accident
3. Death of a family member or close friend
4. Divorce or separation
5. Not able to get a job
6. Lost job
7. Alcohol-related problems
8. Drug-related problems
9. Seeing fights or people beaten up
10. Abuse or violent crime
11. Trouble with the police
12. Family member had gambling problem
13. Been incarcerated
14. Overcrowding at home
15. Discrimination/Racism
16. Vandalism or malicious damage done to property
17. Loss, grief, or profound sadness
18. Mental health issues
19. Poverty or financial hardships
20. Homelessness or housing issues

### Emotions of the Past – PANAS Short Form (Adapted from Thompson, 2007)

Please take some time to think about what your life looked like before your gambling became problematic, and how you feel about this.

Please indicate the extent to which you felt this way in your past before gambling.

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

1. Inspired
2. Determined
3. Safe
4. Hopeful
5. Loved
6. Nervous
7. Distressed
8. Uncertain
9. Lonely
10. Bored

### Clarity of Past Self (Van Gelder, Luciano, Weulen Kranenbarg, & Hershfield, 2015)

Please indicate for each item to what extent you agree or disagree with it by selecting the answer that best reflects your opinion.

1 – disagree completely, 2 – disagree, 3 – don't disagree/don't agree, 4 – agree, 5 – agree completely

1. I find it easy to imagine myself when my gambling wasn't problematic.
2. I do not have a clear image of myself before I started gambling problematically.
3. I find it easy to describe myself before my gambling was problematic.
4. I find it hard to remember what kind of person I was before I started gambling problematically.
5. I have a clear image of who I was before my gambling became problematic.

### Future Preface

In this section, we are going to ask you questions about how you see your life going **after** your gambling is no longer problematic (if you decided to quit or cut down on gambling).

Please take some time to think about your future before answering these questions.

#### **Optimism about Life after Gambling (Adapted from Scheier, Carver, & Bridges, 1994)**

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. Answer according to your own feelings, rather than how you think "most people" would answer.

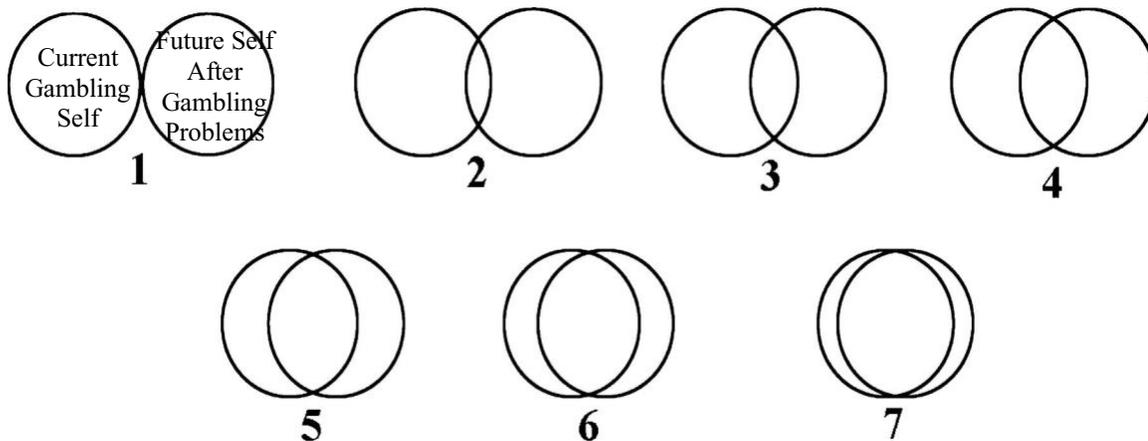
0	1	2	3	4
I disagree a lot	I disagree a little	I neither agree nor disagree	I agree a little	I agree a lot

1. I expect my life to go well for me after I quit or cut down on gambling. (O)
2. A future without problem gambling will be both good and bad. (A)
3. The life I will live after quitting or cutting down on gambling will generally be positive. (O)
4. I am optimistic about my future after quitting or cutting down on gambling. (O)
5. Overall, I expect both good and bad things to happen when I quit or cut down on gambling. (A)
6. I am unsure of how my life will go after I quit or cut down on gambling. (A)
7. I am confident life will be better after I quit or cut down on gambling. (O)
8. If I quit or cut down on gambling, the quality of my life could be better, but also could be worse. (A)

### Future Self-Similarity (Hershfield, 2011)

The following sets of circles show the similarity between your **current self** (today) and the person you will be in the future **when your gambling is no longer problematic** (after you quit or cut down on gambling).

Please select the set of circles that best represents how similar you feel to your future self.



### Longing for the Future Scale (adapted from Kim & Wohl, 2015)

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
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Somewhat Disagree</b>	<b>Neither Agree or Disagree</b>	<b>Somewhat Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>

1. I am already looking forward to the life I will live after I quit or cut down on gambling.
2. I yearn for a life free of gambling problems.
3. I do not long for how my life will be without problem gambling.\*
4. I will like the person I will be after I quit or cut down on gambling better than the person I am today.
5. The person I will be when I am no longer gambling problematically will be better than the person I am today.

### Emotions of the Future – PANAS Short Form (Adapted from Thompson, 2007)

Please take some time to think about what your life would look like if you decided to quit or cut down on gambling, and how you might feel about this.

**Please indicate the extent to which you expect to feel this way in the future without problem gambling.**

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

1. Inspired
2. Determined
3. Safe
4. Hopeful
5. Loved
6. Nervous
7. Distressed
8. Uncertain
9. Lonely
10. Bored

### Clarity of Future Self (Van Gelder, Luciano, Weulen Kranenbarg, & Hershfield, 2015)

Please indicate for each item to what extent you agree or disagree with it by selecting the answer that best reflects your opinion.

1 – disagree completely, 2 – disagree, 3 – don't disagree/don't agree, 4 – agree, 5 – agree completely

1. I find it easy to imagine myself in the future when my gambling is no problematic.
2. I do not have a clear image of who I will be after I quit or cut down on gambling.
3. I find it easy to describe myself in the future when my gambling is no longer problematic.
4. I find it hard to imagine what kind of person I will be after I quit or cut down on gambling.
5. I have a clear image of who I will be after I quit or cut down on gambling.

### Readiness to Change (Biener & Abrams, 1991)

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

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

10	Taking action to change (e.g., cutting down, enrolling in a program).
9	
8	Starting to think about how to change my gambling patterns.
7	
6	
5	I think I should change but not quite ready.
4	
3	
2	I think I need to consider changing someday.
1	
0	No thought of changing

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

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

**Depression and Anxiety (Kroenke, Spitzer, Williams, & Löwe, 2009)**

Over the last 2 weeks, how often have you felt the following?

Not at all	Several days	More than half the days	Nearly every day
1	2	3	4

1. Nervous, anxious, or on edge
2. Not being able to stop or control worrying
3. Down, depressed, or hopeless
4. Little interest or pleasure in doing things

### 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

### Accuracy and Honesty

The following items ask you about the quality of the data you provided us today. **You will receive credit for completing this HIT regardless of your responses.**

1. Did you take the time to read all items and questions? Please respond “yes” or “no”:  
\_\_\_\_\_
2. Did you provide honest responses to all items? Please respond “yes” or “no”:  
\_\_\_\_\_
3. Please estimate how long it took you to complete this survey: \_\_\_\_ minutes
4. For completing this survey, we are offering participants \$1.00. Given the time and effort it took you to complete this task, do you think this is fair? Please let us know why or why not:  
\_\_\_\_\_  
\_\_\_\_\_

## Appendix L: Study 2 Debriefing Form

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

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**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?

Gambling can develop into an addiction, causing harm to an individual's well-being. Many people who gamble excessively feel that their gambling has fundamentally changed who they are as a person. This often leads people to feel nostalgic (i.e., a sentimental longing) for who they were before gambling entered their life.

Past research has shown that these feelings of nostalgia have powerful motivational properties. To date, nostalgia is associated with positive outcomes such as social connectedness, optimism for the future, positive emotions, meaning in life, empathy, and identity continuity. In a previous study, we found that nostalgia can actually ready people for behaviour change when they are engaging in harmful behaviours. For example, problem gamblers and drinkers who felt nostalgic for their life before they started gambling or drinking were more likely to want to cut down on their addictive behaviours. However, many current treatments for addictive behaviours are future-oriented, asking people to envision a possible future without their addictive behaviour.

In this research, we are trying to learn more about the relationships between how people think and feel about their past and future selves and their emotions. We would also like to learn more about how these perceptions of people's pasts and futures influence how ready people are to cut down on their gambling behaviour. That is, we would like to learn about what kind of thoughts of the past and future relate to people's motivation for change.

### Why is this important to scientists or the general public?

This research will contribute to psychologists' knowledge and understanding of how gambling relates to one's self-concept. Specifically, findings from this study will shed light on how people think and feel about their life lived before their gambling became problematic, as well as how people think and feel about their possible future life without gambling problems. Behaviour change interventions may be aided by the outcomes of this study.

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

Yes. It is normal to feel some distress or anxiety when thinking about your gambling behaviour. These emotions are sometimes necessary in order to research or study relationships between somewhat sensitive variables. If you are feeling distressed from answering questions about this experience and would like to talk to someone about it, please feel free 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>.

### **What if I have questions later?**

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](mailto:melissa.salmon@carleton.ca)  
 Julia France: [julia.france@carleton.ca](mailto:julia.france@carleton.ca)  
 Dr. Michael J. A. Wohl: [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca)  
 Mackenzie Dowson: [mackenzie.dowson@carleton.ca](mailto:mackenzie.dowson@carleton.ca)

Should you have any ethical concerns about this research, please contact the REB Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085, or by email: [ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researchers.

### **Where can I get more resources on gambling research?**

If you are interested in learning more about the self-concept and gambling behaviour, please see the following articles:

Kim, H. S., & Wohl, M. J. (2015). The bright side of self-discontinuity: Feeling disconnected with the past self increases readiness to change addictive behaviors (via nostalgia). *Social Psychological and Personality Science*, 6(2), 229-237.

Wohl, M. J., Kim, H. S., Salmon, M., Santesso, D., Wildschut, T., & Sedikides, C. (2018). Discontinuity-induced nostalgia improves the odds of a self-reported quit attempt among people living with addiction. *Journal of Experimental Social Psychology*, 75, 83-94.

If you are interested in additional resources for gambling related resources, The National Center for Responsible Gambling <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 M: Study 3 Recruitment Notice**

### **Gambling and Time (20 mins/\$1.00)**

In this study, you will be asked to answer questions about your gambling and how you think about yourself in relation to your gambling behaviour.

Your participation as well as your responses will be anonymous. No one will know you participated in the study and no one will know how you responded to the questions asked.

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 behaviour. In the event you feel anxiety or distress, information will be provided linking you to appropriate health services in your local area.

### **Eligibility Requirements:**

3. Must be a resident of the United States
4. Must have spent at least \$100 on gambling activities in the past 12 months (e.g., poker, blackjack, roulette, slot machine, sports betting, etc.).

Please note that you will be assessed on your eligibility to participate before completing the survey. There will be additional eligibility criteria not mentioned in this recruitment notice. Please do not submit your HIT if you are not eligible to complete the survey.

This study takes about 20 minutes, and upon completion you will receive US \$1.00 for your participation.

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This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

## Appendix N: Study 3 Informed Consent Form

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 #108822). Ethics expiration date: 31 March 2022.

**Eligibility:** All participants must: 1) be a resident of the United States and 2) have spent at least \$100 on gambling activities in the past 12 months.

Please note that you will be assessed on your eligibility to participate immediately following this consent form. There will be additional eligibility criteria not mentioned in this recruitment notice. Only eligible participants will be permitted to participate in the survey and receive compensation.

---

**Present study:** Gambling and Time

**Research Personnel:** The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Melissa Salmon (Principal Investigator, [melissasalmon@cmail.carleton.ca](mailto:melissasalmon@cmail.carleton.ca)), Lisa Northey (Honours Student, [lisanorthey@cmail.carleton.ca](mailto:lisanorthey@cmail.carleton.ca)), Dr. Michael Wohl (Faculty Investigator, [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca)), Mackenzie Dowson (Other Research Personnel, [mackenziedowson@cmail.carleton.ca](mailto:mackenziedowson@cmail.carleton.ca)), or Blake Miller (Research Assistant, [blakemiller@cmail.carleton.ca](mailto:blakemiller@cmail.carleton.ca)).

Should you have any ethical concerns about this research, please contact the REB Chair, Carleton University Research Ethics Board-B ([ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researchers.

**Purpose:** The purpose of this study is to understand how people think about themselves in relation to their gambling.

**Task Requirements:** In this study, you will be asked to answer questions about your gambling and how you think about yourself in relation to your gambling behaviour.

**Benefits/Compensation:** We are offering eligible participants who complete the study US \$1.00 for participating.

**Duration and Locale:** The survey will be administered online and should take approximately 20 minutes to complete. Be assured that your name will not be associated in any way with the research findings.

**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 not to complete certain questions or to withdraw with no penalty whatsoever. This study is completely anonymous and as such, the researchers will have no way of identifying your responses. Because of this, the researchers will not be able to delete your data upon request. We anticipate the study will be complete by March 31, 2022.

To withdraw at any point, simply click the “proceed” until you reach the debriefing page.

**Anonymity/Confidentiality:** Your participation in this study is anonymous. No identifying information (e.g., name, IP address) will be collected as part of your participation in this study. Although you have been recruited to participate in this study through MTurk, all of your responses and data will be recorded on Qualtrics (and none of your responses will be stored on MTurk). All data on the Qualtrics server is encrypted and protected using multiple layers of security (e.g., encrypted websites and password protected storage). For more information about the security of data on Qualtrics, please see the Qualtrics security and privacy policy, which can be found at the following link: <http://www.qualtrics.com/security-statement>.

Study data will be stored and protected by Qualtrics in Toronto-based servers. However, it may be disclosed via a court order or data breach. 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.

**Data Storing and Sharing:** The data will be stored on the 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 dataset to an online data repository called Open Science Framework (<http://osf.io/>) for research and teaching purposes. Anonymized data may be shared with trusted colleagues.

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Do you agree to participate in this study?

- Yes.
- No.

### Appendix O: Study 3 Eligibility Criteria

1. Over the last 12 months, have you spent more than \$100 on any kinds of gambling activities put together?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)
2. Have you quit gambling in the last three months?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)
3. Have you ever sought treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)
4. Are you currently seeking treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)

*[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.]*

5. 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
6. Have you ever tried to stop, cut down, or control your gambling?
  - a. Yes
  - b. No
7. 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
8. 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

*[page break]*

1. Do you think you have a gambling problem?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)

### **Appendix P: Study 3 Ineligibility Debriefing**

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 about this, you can contact Melissa Salmon at [melissasalmon@email.carleton.ca](mailto:melissasalmon@email.carleton.ca).

## Appendix Q: Study 3 Measures

### Demographics and Gambling Behaviour

1. What is your age? \_\_\_\_\_
2. What is your gender?
  - d. Male
  - e. Female
  - f. Other: \_\_\_\_\_
3. How often do you gamble?
  - f. More than once a day
  - g. More than once a week
  - h. More than once a month
  - i. More than once every 3 months
  - j. Less than once every 3 months
4. Roughly how much money have you spent on gambling in the last 3 months?  
\$ \_\_\_\_\_
5. Roughly how much time have you spent on gambling in the last 3 months?  
\_\_\_\_\_ hours

### Open-Ended Response: Gambling Problems

Please take some time to think about your past and current experiences with gambling.

In the space below, please describe an event that crystallized, in your mind, the idea that you might have a gambling problem.

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**Perceptions of Time (Adapted from Zimbardo & Boyd, 1999; Scheier et al., 1994)**

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. Answer according to your own feelings, rather than how you think "most people" would answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>I disagree a lot</b>	<b>I disagree a little</b>	<b>I neither agree nor disagree</b>	<b>I agree a little</b>	<b>I agree a lot</b>

1. Even before my gambling became problematic, I was unsatisfied with my life. (N)
2. On balance, there is much more good to recall about my life before my gambling became problematic than bad. (P)
3. Even before my gambling became problematic, my life was rather difficult. (N)
4. Positive memories of the life I lived before my gambling became problematic can readily spring to mind. (P)
5. I experienced significant life hardships even before I began gambling problematically. (N)
6. Overall, I would say my life before problem gambling was positive. (P)
7. I expect my life to go well for me after I quit or cut down on gambling. (O)
8. A future without problem gambling will be both good and bad. (A)
9. The life I will live after quitting or cutting down on gambling will generally be positive. (O)
10. I am optimistic about my future after quitting or cutting down on gambling. (O)
11. Overall, I expect both good and bad things to happen when I quit or cut down on gambling. (A)
12. I am unsure of how my life will go after I quit or cut down on gambling. (A)
13. I am confident life will be better after I quit or cut down on gambling. (O)
14. If I quit or cut down on gambling, the quality of my life could be better, but also could be worse. (A)
15. My life is going well. (S)
16. I would like to change many things in my life. (U)
17. I wish I had a different life. (U)
18. I have a good life. (S)
19. In most ways, my life is close to ideal. (S)
20. I am satisfied with my life. (S)
21. Right now, my life is quite difficult. (U)
22. I am unhappy with the way my life turned out. (U)

N = negative past, P = positive past

O = optimistic future, A = ambivalent future

S = satisfied with current life, U = unsatisfied with current life

**NOTE: Mix up order of items in Qualtrics**

## Preface

In this section, we are going to ask you to spend some time reflecting on your life and writing about this.

This research will be the foundation of my PhD dissertation. It will mean a lot if you take time to read the instructions carefully and provide a thoughtful response.

Thank you!

## Manipulation (adapted from Wildschut et al., 2006)

### Positive Past Condition:

Regardless of what has happened in your life or how you have felt in your past **when you were not gambling problematically**, there are often positive moments in life where you have felt safe and secure. This could either be a brief moment or an extended period of time, or a person you felt safe with and loved by. We would like you to take some time to reflect on a positive event that captures this feeling.

Please bring to mind this positive event from your life **before gambling**, think it through and briefly write about it below.

We ask that you spend the next couple minutes writing about this **positive event when you were not gambling problematically**. We have placed a counter on this page to help you take the necessary time to reflect. Be as vivid and descriptive as you can be.

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### Ordinary Past Condition:

Regardless of the ups and downs in your life, there are often numerous **ordinary or mundane events** that you have experienced. This could either be a brief moment or an extended period of time, or an ordinary interaction with another person. We would like you to take some time to reflect on one of these ordinary, mundane experiences.

Please bring to mind this ordinary event that took place in the last week, think it through and briefly write about it below.

We ask that you spend the next couple minutes writing about this **ordinary event from the last week**. We have placed a counter on this page to help you take the necessary time to reflect. Be as vivid and descriptive as you can be.

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### Nostalgia Inventory Scale (Kim & Wohl, 2015)

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.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Somewhat Disagree</b>	<b>Neither Agree or Disagree</b>	<b>Somewhat Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>

1. I am already feeling quite nostalgic about my life before my gambling became problematic.
2. Now that I have started gambling problematically, I miss my previous lifestyle.
3. I long for my life before my gambling became problematic.
4. Before I started gambling problematically, I was a better person than I am today.
5. I like the person I was before I started gambling problematically better than the person I am now.

### Readiness to Change (Biener & Abrams, 1991)

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

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

10	Taking action to change (e.g., cutting down, enrolling in a program).
9	
8	Starting to think about how to change my gambling patterns.
7	
6	
5	I think I should change but not quite ready.
4	
3	
2	I think I need to consider changing someday.
1	
0	No thought of changing

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

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

### **Closeness to Past Self (Baldwin, 2016)**

Please bring to mind the event in your past that you wrote about earlier. Please mark the answer of your choice to each question according to the following scale.

1. How close do you feel to who you were at the time of the event?  
(1 = not close at all, 7 = extremely close)
2. To what extent are you still in contact with people that you interacted with during the time of the event?  
(1 = not at all, 7 = very much)
3. How often does this event come to mind in your daily life?  
(1 = not at all, 7 = very much)
4. How much would you like to leave your current life and return to the time you had just thought about?  
(1 = not at all, 7 = very much)

### **Self-concept Clarity Scale (Campbell, 1996)**

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

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

1. My beliefs about myself often conflict with one another.
2. Sometimes I feel that I am not really the person that I appear to be.
3. My beliefs about myself seem to change very frequently.
4. If I were asked to describe my personality, my description might end up being different from one day to another day.

### **Self-Continuity Index (Sedikides et al., 2015)**

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

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

1. I feel connected with my past.
2. I feel connected with who I was in the past.
3. There is continuity in my life.
4. Important aspects of my personality remain the same across time.

### 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

### Accuracy and Honesty

The following items ask you about the quality of the data you provided us today. **You will receive credit for completing this HIT regardless of your responses.**

1. Did you take the time to read all items and questions? Please respond “yes” or “no”:  
\_\_\_\_\_
2. Did you provide honest responses to all items? Please respond “yes” or “no”:  
\_\_\_\_\_
3. Please estimate how long it took you to complete this survey: \_\_\_\_ minutes
4. For completing this survey, we are offering participants \$1.00. Given the time and effort it took you to complete this task, do you think this is fair? Please let us know why or why not:  
\_\_\_\_\_  
\_\_\_\_\_

## **Appendix R: Study 3 Debriefing Form**

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

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**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?**

Gambling can develop into an addiction, causing harm to an individual's well-being. Many people who gamble excessively feel that their gambling has fundamentally changed who they are as a person. This often leads people to feel nostalgic (i.e., a sentimental longing) for who they were before gambling entered their life.

Past research has shown that these feelings of nostalgia have powerful motivational properties. To date, nostalgia is associated with positive outcomes such as social connectedness, optimism for the future, positive emotions, meaning in life, empathy, and identity continuity. In a previous study, we found that nostalgia can actually ready people for behaviour change when they are engaging in harmful behaviours. For example, problem gamblers and drinkers who felt nostalgic for their life before they started gambling or drinking were more likely to want to cut down on their addictive behaviours. However, many current treatments for addictive behaviours are future-oriented, asking people to envision a possible future without their addictive behaviour.

In this research, we are trying to learn more about the relationships between how people think and feel about their past self and their emotions. We would also like to learn more about how these perceptions of people's pasts influence how ready people are to cut down on their gambling behaviour. That is, we would like to learn about what kind of thoughts of the past relate to people's motivation for change.

### **Why is this important to scientists or the general public?**

This research will contribute to psychologists' knowledge and understanding of how gambling relates to one's self-concept. Specifically, findings from this study will shed light on how people think and feel about their life lived before their gambling became problematic. Behaviour change interventions may be aided by the outcomes of this study.

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

Yes. It is normal to feel some distress or anxiety when thinking about your gambling behaviour. These emotions are sometimes necessary in order to research or study relationships between somewhat sensitive variables. If you are feeling distressed from answering questions about this experience and would like to talk to someone about it, please feel free 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>.

### **What if I have questions later?**

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](mailto:melissa.salmon@carleton.ca)  
 Dr. Michael J. A. Wohl: [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca)  
 Lisa Northey: [lisa.northey@carleton.ca](mailto:lisa.northey@carleton.ca)  
 Mackenzie Dowson: [mackenzie.dowson@carleton.ca](mailto:mackenzie.dowson@carleton.ca)  
 Blake Miller: [blake.miller@carleton.ca](mailto:blake.miller@carleton.ca)

Should you have any ethical concerns about this research, please contact the REB Chair, Carleton University Research Ethics Board-B ([ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researchers.

### **Where can I get more resources on gambling research?**

If you are interested in learning more about the self-concept and gambling behaviour, please see the following articles:

Kim, H. S., & Wohl, M. J. (2015). The bright side of self-discontinuity: Feeling disconnected with the past self increases readiness to change addictive behaviors (via nostalgia). *Social Psychological and Personality Science*, 6(2), 229-237.

Wohl, M. J., Kim, H. S., Salmon, M., Santesso, D., Wildschut, T., & Sedikides, C. (2018). Discontinuity-induced nostalgia improves the odds of a self-reported quit attempt among people living with addiction. *Journal of Experimental Social Psychology*, 75, 83-94.

If you are interested in additional resources for gambling related resources, The National Center for Responsible Gambling <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 S: Study 4 Recruitment Notice**

### **Gambling and Time (15 mins/\$1.00)**

In this study, you will be asked to answer questions about your gambling and how you think about yourself in relation to your gambling behaviour.

Your participation as well as your responses will be anonymous. No one will know you participated in the study and no one will know how you responded to the questions asked.

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 behaviour. 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. Must be a resident of the United States
2. Must have spent at least \$100 on gambling activities in the past 12 months (e.g., poker, blackjack, roulette, slot machine, sports betting, etc.).

Please note that you will be assessed on your eligibility to participate before completing the survey. There will be additional eligibility criteria not mentioned in this recruitment notice. Please do not submit your HIT if you are not eligible to complete the survey.

This study takes about 15 minutes, and upon completion you will receive US \$1.00 for your participation.

---

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

## Appendix T: Study 4 Informed Consent Form

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 #108822). Ethics expiration date: 31 March 2022.

**Eligibility:** All participants must: 1) be a resident of the United States and 2) have spent at least \$100 on gambling activities in the past 12 months.

Please note that you will be assessed on your eligibility to participate immediately following this consent form. There will be additional eligibility criteria not mentioned in this recruitment notice. Only eligible participants will be permitted to participate in the survey and receive compensation.

**Present study:** Gambling and Time

**Research Personnel:** The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Melissa Salmon (Principal Investigator, [melissasalmon@cmail.carleton.ca](mailto:melissasalmon@cmail.carleton.ca)), Lisa Northey (Honours Student, [lisanorthey@cmail.carleton.ca](mailto:lisanorthey@cmail.carleton.ca)), Dr. Michael Wohl (Faculty Investigator, [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca)), Mackenzie Dowson (Other Research Personnel, [mackenziedowson@cmail.carleton.ca](mailto:mackenziedowson@cmail.carleton.ca)), or Blake Miller (Research Assistant, [blakemiller@cmail.carleton.ca](mailto:blakemiller@cmail.carleton.ca)).

Should you have any ethical concerns about this research, please contact the REB Chair, Carleton University Research Ethics Board-B ([ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researchers.

**Purpose:** The purpose of this study is to understand how people think about themselves in relation to their gambling.

**Task Requirements:** In this study, you will be asked to answer questions about your gambling and how you think about yourself in relation to your gambling behaviour.

**Benefits/Compensation:** We are offering eligible participants who complete the study US \$1.00 for participating.

**Duration and Locale:** The survey will be administered online and should take approximately 15 minutes to complete. Be assured that your name will not be associated in any way with the research findings.

**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 not to complete certain questions or to withdraw with no penalty whatsoever. This study is completely anonymous and as such, the researchers will have no way of identifying your responses. Because of this, the researchers will not be able to delete your data upon request. We anticipate the study will be complete by March 31, 2022.

To withdraw at any point, simply click the “proceed” until you reach the debriefing page.

**Anonymity/Confidentiality:** Your participation in this study is anonymous. No identifying information (e.g., name, IP address) will be collected as part of your participation in this study. Although you have been recruited to participate in this study through MTurk, all of your responses and data will be recorded on Qualtrics (and none of your responses will be stored on MTurk). All data on the Qualtrics server is encrypted and protected using multiple layers of security (e.g., encrypted websites and password protected storage). For more information about the security of data on Qualtrics, please see the Qualtrics security and privacy policy, which can be found at the following link: <http://www.qualtrics.com/security-statement>.

Study data will be stored and protected by Qualtrics in Toronto-based servers. However, it may be disclosed via a court order or data breach. 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.

**Data Storing and Sharing:** The data will be stored on the 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 dataset to an online data repository called Open Science Framework (<http://osf.io/>) for research and teaching purposes. Anonymized data may be shared with trusted colleagues.

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Do you agree to participate in this study?

- Yes.
- No.

### Appendix U: Study 4 Eligibility Criteria

1. Over the last 12 months, have you spent more than \$100 on any kinds of gambling activities put together?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)
2. Have you quit gambling in the last three months?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)
3. Have you ever sought treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)
4. Are you currently seeking treatment for gambling-related problems?
  - a. Yes (not eligible – redirect to ineligibility debriefing)
  - b. No (continue)

*[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

*[page break]*

5. Do you think you have a gambling problem?
  - a. Yes (continue)
  - b. No (not eligible – redirect to ineligibility debriefing)

**Appendix V: Study 4 Ineligibility Debriefing**

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 about this, you can contact Melissa Salmon at [melissasalmon@cmail.carleton.ca](mailto:melissasalmon@cmail.carleton.ca).

**Appendix W: Study 4 Measures****Demographics and Gambling Behaviour**

1. What is your age? \_\_\_\_\_
2. What is your gender?
  - g. Male
  - h. Female
  - i. Other: \_\_\_\_\_
3. How often do you gamble?
  - k. More than once a day
  - l. More than once a week
  - m. More than once a month
  - n. More than once every 3 months
  - o. Less than once every 3 months
4. Roughly how much money have you spent on gambling in the last 3 months?  
\$ \_\_\_\_\_
5. Roughly how much time have you spent on gambling in the last 3 months?  
\_\_\_\_\_ hours

**Open-Ended Response: Gambling Problems**

Please take some time to think about your past and current experiences with gambling.

In the space below, please describe an event that crystallized, in your mind, the idea that you might have a gambling problem.

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**Perceptions of Time (Adapted from Zimbardo & Boyd, 1999; Scheier et al., 1994)**

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. Answer according to your own feelings, rather than how you think "most people" would answer.

1	2	3	4	5
I disagree a lot	I disagree a little	I neither agree nor disagree	I agree a little	I agree a lot

1. Even before my gambling became problematic, I was unsatisfied with my life. (N)
2. On balance, there is much more good to recall about my life before my gambling became problematic than bad. (P)
3. Even before my gambling became problematic, my life was rather difficult. (N)
4. Positive memories of the life I lived before my gambling became problematic can readily spring to mind. (P)
5. I experienced significant life hardships even before I began gambling problematically. (N)
6. Overall, I would say my life before problem gambling was positive. (P)
7. I expect my life to go well for me after I quit or cut down on gambling. (O)
8. A future without problem gambling will be both good and bad. (A)
9. The life I will live after quitting or cutting down on gambling will generally be positive. (O)
10. I am optimistic about my future after quitting or cutting down on gambling. (O)
11. Overall, I expect both good and bad things to happen when I quit or cut down on gambling. (A)
12. I am unsure of how my life will go after I quit or cut down on gambling. (A)
13. I am confident life will be better after I quit or cut down on gambling. (O)
14. If I quit or cut down on gambling, the quality of my life could be better, but also could be worse. (A)
15. My life is going well. (S)
16. I would like to change many things in my life. (U)
17. I wish I had a different life. (U)
18. I have a good life. (S)
19. In most ways, my life is close to ideal. (S)
20. I am satisfied with my life. (S)
21. Right now, my life is quite difficult. (U)
22. I am unhappy with the way my life turned out. (U)

N = negative past, P = positive past

O = optimistic future, A = ambivalent future

S = satisfied with current life, U = unsatisfied with current life

**NOTE: Mix up order of items in Qualtrics**

## Preface

In this section, we are going to ask you to spend some time reflecting on your future and writing about this.

This research will be the foundation of my PhD dissertation. It will mean a lot if you take time to read the instructions carefully and provide a thoughtful response.

Thank you!

## Manipulation (adapted from Wildschut et al., 2006)

### Positive Future Condition:

Regardless of what will happen in your life or how you will feel in your future **after you quit or cut down on gambling**, there will often be positive aspects in life to look forward to. This could either be a positive feeling or an extended period of time, or an improved relationship with someone important to you. We would like you to take some time to write about a positive aspect of your future that captures this feeling.

Please bring to mind this positive aspect of your future **without gambling**, think it through and briefly write about it below.

We ask that you spend the next couple minutes writing about this **positive aspect of your future after you are no longer gambling problematically**. We have placed a counter on this page to help you take the necessary time to reflect. Be as vivid and descriptive as you can be.

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### Ordinary Future Condition:

Regardless what will happen in your life or how you will feel in your future, there are often numerous **ordinary or mundane aspects of life** that you will experience. This could either be a brief moment or an extended period of time, or an ordinary interaction with another person. We would like you to take some time to write about this ordinary, mundane aspect of your life that you expect to happen in the next week.

Please bring to mind this ordinary aspect of your life that you expect to happen in the next week, think it through and briefly write about it below.

We ask that you spend the next couple minutes writing about this **ordinary aspect of your life** that you expect to happen in the next week. We have placed a counter on this page to help you take the necessary time to reflect. Be as vivid and descriptive as you can be.

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**Longing for the Future Scale (adapted from Kim & Wohl, 2015)**

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. I am already looking forward to the life I will live after I quit or cut down on gambling.
2. I yearn for a life free of gambling problems.
3. I do not long for how my life will be without problem gambling.\*
4. I will like the person I will be after I quit or cut down on gambling more than the person I am today.
5. The person I will be when I am no longer gambling problematically will be better than the person I am today.

### Readiness to Change (Biener & Abrams, 1991)

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

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

10	Taking action to change (e.g., cutting down, enrolling in a program).
9	
8	Starting to think about how to change my gambling patterns.
7	
6	
5	I think I should change but not quite ready.
4	
3	
2	I think I need to consider changing someday.
1	
0	No thought of changing

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

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

**Clarity of Future Self (Van Gelder, Luciano, Weulen Kranenbarg, & Hershfield, 2015)**

Please indicate for each item to what extent you agree or disagree with it by selecting the answer that best reflects your opinion.

1 – disagree completely, 2 – disagree, 3 – don't disagree/don't agree, 4 – agree, 5 – agree completely

1. I find it easy to imagine myself in the future when my gambling is no longer problematic.
2. I can clearly see what kind of person I will be after I quit or cut down on gambling.
3. I find it easy to describe myself in the future when my gambling is no longer problematic.
4. I find it easy to imagine what kind of person I will be after I quit or cut down on gambling.
5. I have a clear image of who I will be after I quit or cut down on gambling.

**Self-concept Clarity Scale (Campbell, 1996)**

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

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

1. My beliefs about myself often conflict with one another.
2. Sometimes I feel that I am not really the person that I appear to be.
3. My beliefs about myself seem to change very frequently.
4. If I were asked to describe my personality, my description might end up being different from one day to another day.

**Self-Continuity Index (Sedikides et al., 2015)**

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

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

1. I feel connected with my future.
2. I feel connected with who I will be in the future.
3. There is continuity in my future.
4. Important aspects of my personality will remain the same across time.

### 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

### Accuracy and Honesty

The following items ask you about the quality of the data you provided us today. **You will receive credit for completing this HIT regardless of your responses.**

1. Did you take the time to read all items and questions? Please respond “yes” or “no”:  
\_\_\_\_\_
2. Did you provide honest responses to all items? Please respond “yes” or “no”:  
\_\_\_\_\_
3. Please estimate how long it took you to complete this survey: \_\_\_\_ minutes
4. For completing this survey, we are offering participants \$1.00. Given the time and effort it took you to complete this task, do you think this is fair? Please let us know why or why not:  
\_\_\_\_\_  
\_\_\_\_\_

## Appendix X: Study 4 Debriefing Form

This study has received clearance by the Carleton University Research Ethics Board-B (Reference #108822).

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**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?

Gambling can develop into an addiction, causing harm to an individual's well-being. Many people who gamble excessively feel that their gambling has fundamentally changed who they are as a person. This often leads people to long for a better possible future that can be attained once they are no longer gambling.

Past research has shown that a future focus has powerful motivational properties. To date, a future focus is associated with positive outcomes such as taking less risks, higher motivation, and adopting a healthier lifestyle. In a previous study, we found that optimism for the future can actually ready people for behaviour change when they are engaging in harmful behaviours. For example, people with gambling problems who felt optimistic about a future without gambling were more likely to want to cut down on their gambling behaviour. However, this may depend on how clear one's future is in the mind's eye.

In this research, we are trying to learn more about the relationships between how people think and feel about their future self and their emotions. We would also like to learn more about how these perceptions of people's futures influence how ready people are to cut down on their gambling behaviour. That is, we would like to learn about what kind of thoughts of the future relate to people's motivation for change.

### Why is this important to scientists or the general public?

This research will contribute to psychologists' knowledge and understanding of how gambling relates to one's self-concept. Specifically, findings from this study will shed light on how people think and feel about the life they expect to live after they quit or cut down on gambling. Behaviour change interventions may be aided by the outcomes of this study.

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

Yes. It is normal to feel some distress or anxiety when thinking about your gambling behaviour. These emotions are sometimes necessary in order to research or study relationships between somewhat sensitive variables. If you are feeling distressed from answering questions about this experience and would like to talk to someone about it, please feel free 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>.

### **What if I have questions later?**

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](mailto:melissa.salmon@carleton.ca)

Dr. Michael J. A. Wohl: [michael.wohl@carleton.ca](mailto:michael.wohl@carleton.ca)

Lisa Northey: [lisa.northey@carleton.ca](mailto:lisa.northey@carleton.ca)

Mackenzie Dowson: [mackenzie.dowson@carleton.ca](mailto:mackenzie.dowson@carleton.ca)

Blake Miller: [blake.miller@carleton.ca](mailto:blake.miller@carleton.ca)

Should you have any ethical concerns about this research, please contact the REB Chair, Carleton University Research Ethics Board-B ([ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researchers.

### **Where can I get more resources on gambling research?**

If you are interested in learning more about the self-concept and gambling behaviour, please see the following articles:

Kim, H. S., & Wohl, M. J. (2015). The bright side of self-discontinuity: Feeling disconnected with the past self increases readiness to change addictive behaviors (via nostalgia). *Social Psychological and Personality Science*, 6(2), 229-237.

Salmon, M. M. & Wohl, M. J. A. (2020). Longing for the past and longing for the future: A phenomenological assessment of the relation between temporal focus and readiness to change among people living with addiction. *Frontiers in Psychology*, 11:1794.

If you are interested in additional resources for gambling related resources, The National Center for Responsible Gambling <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 Y: Study 1 Participants' Experiential Narratives

### Past Condition

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#### C1. My life was more positive before gambling became problematic ( $n = 15$ )

---

- (1) I had everything I needed around me
- (9) It was a glorious life
- (10) We have so much fun just focused on the present
- (15) Life was calmer
- (17) I had fewer problems
- (19) Life was far better before I went to that first dog race!
- (20) My life before gambling was a lot less stressful...I enjoyed life a lot more
- (25) I think I had a better future...I had more peace
- (26) Gambling changed my life completely [*for the worse – past was better*]
- (37) Everything has become harder for me...before I had a chance in life
- (38) I think my life was a little more worth living
- (43) I used to enjoy life a lot more
- (44) I looked forward to doing different things on the weekends
- (45) I lived more in the moment...I enjoyed other things in my life
- (54) ...I was living life

---

#### C2. I had better social connections before my gambling became problematic ( $n = 21$ )

---

- (1) I was definitely more socially connected than I am now...I went out with friends
  - (4) ...my husband and kids could trust me
  - (5) I miss my wife...
  - (7) ...and I always had people to do it with
  - (9) I was married to the love of my life and could not have been happier
  - (10) I am so much more focused on my family and friends during these times
  - (14) I played sports with friends
  - (15) My wife was less stressed...our time that we spent together seemed more memorable
  - (17) I used to spend time with family and friends
  - (19) My life was filled with...time with family and friends
  - (20) I...did more things with friends
  - (25) I had a very good couple I was 4 years with her
  - (26) Before I started gambling I had a girlfriend
  - (37) ...everyone loved me, now I feel like everyone despises me and does not want me around
  - (38) I had plenty of friends
  - (43) I spent a lot of time with my friends and family
  - (44) I spent more time with friends and family
-

- 
- (50) Quality family times which ought to be spent together are not as numbered as before
  - (54) My relationship with my family was much more stable
  - (57) I was unselfish and generous to my friends
  - (60) It does affect my relationships...the lying
- 

C3. I was involved in more meaningful activities before my gambling became problematic ( $n = 19$ )

---

- (7) I've become hyper-focused on the casinos lately as well, not wanting to do anything but go to them
  - (9) We would do recreational activities, day trips and boating
  - (10) Before gambling and during my breaks I cook for my family every day, we go on family trips
  - (12) I played a lot of video games and hung out with friends
  - (14) I played sports with friends. I invited friends over to play poker and hang out. I liked to go fishing and hunting
  - (17) I used to spend time with family and friends doing things like going to the movies because I had extra money, I can no longer do that
  - (19) Before I began gambling my life was filled with sporting activities
  - (20) The majority of my time was filled with activities with them
  - (25) I went to church
  - (31) My days were mainly filled with work mainly and watching tv or spending time with friends and family
  - (37) I was able to do things and get things accomplished
  - (38) We always went on trips together
  - (43) I also had other hobbies I gave up perusing because I started spending all my time and money on card games
  - (44) I spent more time with friends and family doing other recreational activities
  - (45) I enjoyed other things in my life and did not wish my time away
  - (50) Before I became engrossed in these machine games, I had lots of spare time majority of which I spent on reading novels and the occasional online games
  - (54) Friends, girl, sports, and xbox filled my days and I was living life
  - (55) I think I spent more time doing leisure activities instead of figuring out everything I wanted to do to gamble
  - (57) We went out together more, for meals and on romantic dates
- 

C4. I was a better person before my gambling became problematic ( $n = 10$ )

---

- (9) I was so far from the person that I am today
  - (14) I had more self-confidence
  - (19) I had become a person I never wanted to be
  - (20) I would like to go back to the old me
  - (25) I was a very sweet person
-

- 
- (37) I was actually a real person
  - (40) I was a person full of life
  - (43) I was a bit arrogant as I grew older...did not realize I was becoming addicted to gambling
  - (54) I personally was a very happy person
  - (57) I was a pretty transparent, honest person
- 

C5. Gambling took over my life (themes of discontinuity;  $n = 6$ )

---

- (9) I was so far from the person that I am today
  - (17) ...before gambling took over my life
  - (19) I had become a person I never wanted to be
  - (26) Gambling changed my life completely
  - (37) It feels like night and day
  - (43) gambling...took over a lot of my life
- 

C6. Gambling has not changed the quality of my life (or my social connections;  $n = 8$ )

---

- (12) My life was (and still is) quite uninteresting
  - (27) I lived and still live alone
  - (29) I don't think my gambling changed my life so much
  - (31) My relationships didn't change much really
  - (33) My life was already very hard before I started gambling
  - (34) My life has been the same
  - (49) Life was and still is about living paycheck to paycheck
  - (55) I think not too much has really changed with my friends though ultimately
- 

C7. Parts of my past were positive and parts of my past were negative (mixed bag;  $n = 4$ )

---

- (5) I seldom found myself outside of the house with little friends...the many dates we had [wife] back then I now look fondly upon
  - (27) I had my dog...he took up a lot of my time...then my dog died
  - (40) Things started to shift for me and I started to go down a very serious rabbit hole
  - (60) before it got bad I was so bored with life...Before my gambling became a problem I did pretty normal things, go to work, come home, run some errands
- 

C8. There was a pivotal (traumatic) event that triggered my gambling ( $n = 3$ )

---

- (27) Then my dog died...that was about ten years ago when the playing increased
  - (33) In the year before I started, two of my siblings committed suicide
  - (40) What broke the camel's back was when I lost my uncle
- 

C9. I will not change my gambling behaviour ( $n = 5$ )

---

- (27) I am trying to win enough money to leave this horribly boring area
-

- 
- (29) I don't think I will ever be able to completely stop
  - (34) They say you can not win if you do not play...everyone wants a way out of that lifestyle
  - (49) It's a rush I can't describe
  - (60) Gambling really just creates a little bit of excitement
- 

C10. I was happier before my gambling became problematic ( $n = 8$ )

---

- (9) ...could not have been happier
  - (14) I was happier and less depressed
  - (15) I seemed to be less stressed
  - (17) I was a lot happier and a lot less stressed
  - (38) I think I was a little more relaxed then
  - (40) I was much happier
  - (54) I felt free
  - (57) I was rarely anxious
- 

C11. My financial situation was better before my gambling became problematic ( $n = 15$ )

---

- (4) I had a better job with better pay
  - (7) I always had enough money to do the things that I wanted to do
  - (10) Focused on the present and not worrying about the money
  - (9) I was saving and planning for my kids college educations
  - (15) I seemed to be less stressed about my obligations to bills and other expenses
  - (17) I didn't have to scrape by quarters to buy groceries
  - (20) I worry all the time now about...money
  - (25) I...did not lose money
  - (29) ...the amount of free money has been less
  - (31) I put a name to every penny I had and had savings goals
  - (40) I had so much money that I had no idea what to do with it
  - (44) I definitely saved more money for myself and my family
  - (50) I have lesser spare change now
  - (54) ...try to win all the money I have lost back
  - (57) I was rarely anxious or worried about money
- 

C12. I am resistant to changing my gambling behaviour ( $n = 6$ )

---

- (5) I miss my wife...but all the girls you can get when you win big takes some of the loss off your mind
  - (7) I don't have enough money sometimes for basic things...I've become hyper focused on the casinos lately as well, not wanting to do anything really but go to them
  - (10) ...it's getting harder the more I feel the fire burning
  - (20) I would like to go back to the old me...but that's easier said than done
-

- 
- (37) Before I felt like I had a purpose [...] I cannot imagine that I could ever be the person that I was then
  - (45) Even the guilty feelings are not enough to make me give up my gambling trips
- 

### Future Condition

---

C1. I will be happier when my gambling is no longer problematic ( $n = 9$ )

---

- (18) I will feel much more calm
  - (22) Overall I think I would be much happier
  - (24) I will be patient and avoid anxiety
  - (28) I would be a much better and happier person in life
  - (39) I'd be happier and have less stress
  - (41) I think I would be more carefree and alive and present
  - (48) I would...probably be a little more proud of myself
  - (56) My emotions will be much more stable
  - (59) I'd feel more unburdened
- 

C2. My finances will be better after my gambling is no longer problematic ( $n = 16$ )

---

- (2) I would spend my money on me and my family
  - (6) I'd definitely have a lot of disposable income
  - (11) I assume I'd have more money
  - (18) It would be a relief when my days are not filled with worrying about financial issue caused by my gambling
  - (22) I also would have more money to put into savings
  - (23) I know that I would be saving more money if I stopped
  - (24) I would be much more responsible in the use of my money and maybe even save some for a [rainy day]
  - (28) I would not have financial problems on paying my bills
  - (36) I think I can save myself a lot of money
  - (39) I'd have more money in a savings account
  - (46) I would not waste as much money
  - (48) ...doing more real work to bring home a decent paycheck
  - (51) I could go back to school and take up something that would bring my family more money
  - (52) I would have more money saved
  - (56) The amount being spent on gambling can be saved for a much more better form of investment
  - (59) I could invest that money in retirement...I would generally be getting an honest return for my money rather than just throwing caution to the wind
-

---

C3. I will engage in more meaningful activities after my gambling is no longer problematic ( $n = 18$ )

---

- (3) I would have more time to read, cook, live my life
  - (6) I could have money to do other fun things
  - (8) I would probably focus on a new hobby
  - (11) Probably...travel a lot more often
  - (13) Clean more, pick up cooking, maybe get a job
  - (18) I will have much more time focusing on immediate and future goals
  - (22) I would be able to spend a lot more time developing other hobbies
  - (23) I might start going shopping instead
  - (24) I would also engage my mind in more constructive thinking such as better ways of making money...this will enable me to make positive moves about my future plans
  - (28) I would want to go on vacation and visit places
  - (39) My days would be filled with me pursuing my hobbies
  - (46) I could probably go out to eat more, take trips more, go out to the movies
  - (48) I would live a life doing other things for fun and joy...I could spend my time investing, playing sports or going out and exercising more
  - (51) I could go back to school
  - (52) I may have more time on my hands to do others things... pick up different and new [hobbies]...take up some classes, learn some new skills
  - (56) The time spent on gambling can be diverted to much better and rewarding activities
  - (58) I will...do things that are positive to my self like reading books and journals, doing some exercise
  - (59) I would probably have to fill it in with other things I find to be fun...leisurely and enjoyable things, like skiing
- 

C4. Parts of my life will be better, parts of my life will stay the same, and parts of my life will be worse (mixed bag;  $n = 11$ )

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- (2) It would either get better and I would spend my money on me and my family, or I would transfer the money I spend on gambling into sending it on drugs
  - (6) I don't know exactly how much would change
  - (8) I think it would be quite hard because I've done it for almost 10 years and I really enjoy it...If I did quit gambling I would probably focus on a new hobby
  - (13) I am not sure what I would be filling my head and thoughts with. On the other hand, I suppose my life would be a lot calmer
  - (23) I think I would feel like something is missing in my life...I'm worried that I would feel bored all of the time...I know that I would be saving more money...I think my life would improve in the sense that I would be able to pay off some of the debt
  - (32) Life would be a bit blander...On the other hand, I wouldn't have to be concerned with my gambling getting totally out of control
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- (35) I would basically have about the same amount of money...I would be a bit less fun and less driven
  - (41) I think at first my life would be like hell...but I think it would be necessary for my happiness
  - (42) People are going to say wow you really broke it huh. Good for you...Then you are going to have those that don't want to see you grow or succeed
  - (52) My life would pretty much the same... *[then lists possible improvements]*
  - (58) ...lots will change about me both positive and negative
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C5. I am resistant to changing my gambling behaviour ( $n = 13$ )

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- (2) It is frustrating and I feel like a failure in life, but there's not much I can do about it currently
  - (3) If I had to watch myself gamble, I would be disgusted by myself, but I don't have to do that
  - (6) It's not like I haven't thought about this before or tried stopping
  - (8) I think it would be quite hard because I've done it for almost 10 years and I really enjoy it
  - (13) I think it would be very hard...I wish I could quit
  - (18) I am mentally and physically exhausted because of negative impacts that gambling has on many aspects of my daily life
  - (23) I think I would be tempted all of the time to stop at the casino...I think it would be something that would be very hard to overcome
  - (28) Having this problem is really hard when you think that you can make money at gambling
  - (32) I think I would miss the opportunity for the excitement it provides
  - (36) My life would be a lot better if I change my gambling, but I don't think I can stop
  - (41) ...it's going to be something that is going to be very difficult
  - (48) I would still want to spend some time having fun and play a few slots or bet on football if I feel its a win, but lower bets/small amounts less time being spent
  - (58) How it will feel quitting gambling makes me sigh some of the time. I think if I decided to quit gambling a lots will change about me both positive and negative
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C6. My social connections will be better after my gambling is no longer problematic ( $n = 19$ )

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- (6) I would be able to spend time with my friends again
  - (8) I also think I would spend more time with family and friends
  - (11) Probably spend more time with friends
  - (13) ...my husband and I wouldn't be arguing about money so much
  - (18) My family and fiancé would be extremely happy
  - (22) I would have more time for my family and friends
  - (23) I think my relationships might improve a little bit
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- (24) I would spend more quality time with my friends and family
  - (28) I would be more sociable with my friends and family
  - (30) ...if I change my family life mainly improve
  - (39) I'd have money to spend on others which...would contribute to their happiness in a way
  - (41) My friends would appreciate it as well as my family
  - (42) Boy would I receive a lot of phone calls. People are going to say wow you really broke it huh
  - (46) I would also have more time to spend with family and friends
  - (48) My relationship with my family would be better
  - (51) I would have more time with family and I would get better friends
  - (52) ...maybe spend more time with family and friends
  - (58) I also think my partner will trust me more with his money
  - (59) cook at home, as I am good at cooking, and my family loves my creations
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C7. My life will be more positive when my gambling is no longer problematic ( $n = 9$ )

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- (13) I suppose my life would be a lot calmer, more stable and probably happier
  - (22) I think it would be much less stressful and more relaxing
  - (23) I think my life would improve in the sense that I would be able to pay off some of the debt that I have (credit cards, student loans, vehicle loans) faster
  - (28) ...my life would be perfect or pretty close to it
  - (36) My life would be a lot better if I change my gambling
  - (39) I'd be in a more secure place in my life...I'd be leading a happier life
  - (46) I think if I stopped gambling my life would improve a lot at work, at home, and pretty much in all aspects of my life
  - (48) life would be a whole lot more relaxing
  - (56) I will definitely live a much more better life
- 

C8. I will be a better person when my gambling is no longer problematic ( $n = 7$ )

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- (18) I would be a much more happy and life loving man
  - (24) If I quit gambling today, I will be a better person tomorrow
  - (28) I would be a much better and happier person in life
  - (39) I'd be more respected in the eyes of others
  - (41) I think I would be more carefree and alive and present
  - (48) I would be a happier person...a more well rounded person
  - (58) I think I will be a better person
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C9. Mention of a new beginning ( $n = 10$ )

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- (8) I would probably focus on a new hobby
  - (13) ...pick up cooking, maybe get a job
  - (22) I would be able to spend a lot more time developing other hobbies
  - (23) I might start going shopping
  - (39) I'd also have the money to do things like trying to open my own business
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- (48) I get into a real relationship because I get my thrills from being with someone... get my MBA
  - (51) I would get better friends who don't encourage me
  - (52) ...pick up different and new hobbies...learn some new skills
  - (56) I will stop living on the edge and start doing much more resourceful things with the time
  - (59) I think I would most likely try to either invest in retirement funds to help myself out in the future
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C10. I will not change my gambling behaviour ( $n = 3$ )

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- (16) Not everyone can see sports gambling for what it is: fun!
  - (35) I like the energy it brings me even if I lose
  - (52) Everyone has their vices...but I have the funds to do so...so maybe I will stop or maybe I will continue to do what I enjoy...because I'm good at it and its my life to live
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C11. My future without gambling is vague/uncertain ( $n = 4$ )

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- (2) I feel like my life could go one of two ways
  - (11) I have no idea exactly how my life would go
  - (13) I am not sure what I would be filling my head and thoughts with
  - (32) On the other hand... *[lists various scenarios]*
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C12. My life would have been hypothetically better if I hadn't gambled (expression of upward counterfactual;  $n = 3$ )

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- (3) I could probably have a home in Costa Rica or Greece if I saved the money I spent on gambling
  - (16) If I didn't gamble, I would have avoided some fighting with past relationships
  - (39) My life would have been more stable
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