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Self-efficacy and Problem Gambling: Establishing Construct Validity

by

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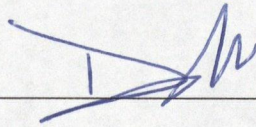
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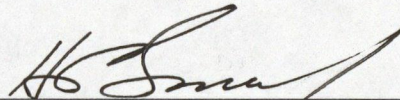
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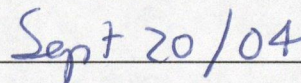
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Abstract

The current follow-up study examined theories of self-efficacy in a community sample of problem gamblers (63 women, 34 men) who quit gambling in 1998. The longitudinal information revealed that self-efficacy to resist gambling predicted the time to first gamble: individuals with lower self-efficacy scores relapsed sooner than those with higher scores. Regression analysis revealed that self-efficacy predicted the average days gambled and the average amount gambled per day for 6 and 12 months, but not for 3 or 60 month follow-ups. Self-efficacy at 3 months mediated the relationship between past performance and the amount gambled per day at 12 months. Contrary to theory, negative affect exerted a stronger influence on self-efficacy judgments than past performance. The hypothesis that outcome expectancy is independent from self-efficacy was strongly supported. This study failed to support the hypothesis that self-efficacy predicts specific relapse situations. Overall, the findings support self-efficacy's construct validity with problem gamblers.

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This thesis is dedicated to my parents, Eleanor and Hugh Peden

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Self-efficacy and Problem Gambling: Establishing Construct Validity

The accessibility of gambling venues is pervasive, with Canada currently sporting over 38,252 video lottery terminals, 31,537 slot machines, 59 casinos, 70 racetracks, 1,880 bingo centers and 32,932 lottery ticket centers (Azmier, 2001). The number of people reporting problems with gambling has increased proportionally with greater availability (Shaffer, Hall, & Vander Bilt, 1999; Shaffer & Hall, 2001). Rates of problem gambling among Canadians have been examined, with approximately 5% of those surveyed currently experiencing gambling problems (Smith & Wynne, 2002; Shaffer & Hall, 2001; Wynne Resources, 1998). Success rates for cessation of problem gambling have varied, with relapse rates reported as high as 94 % (Hodgins & el-Guebaly, 2004; Hodgins, el-Guebaly, & Armstrong, 2001). These exceptionally high relapse rates underscore the need for a better understanding of factors related to recovery from problem gambling.

Self-efficacy, a person's confidence in their ability to perform an action, has been identified as a cognitive process involved in successful behaviour change (Bandura, 1977, 1997). Several models of addiction relapse incorporate the theories of self-efficacy and much research exists to support the application of these models (e.g., Prochaska & DiClemente's Transtheoretical Model, 1983). Our understanding of self-efficacy in relation to problem gambling is limited due to the scant research available. Initial efforts should focus on establishing the theorized relations of a construct, thereby strengthening the validity of any model integrating that construct (Stephens, Wertz, & Roffman, 1995). Research aimed at examining the construct validity of self-efficacy in the area of problem gambling would also facilitate a better

understanding of the recovery process. Such work could lead to the development of relapse prevention models for problem gambling and improve the likelihood of successful recovery.

In recognition of the limited research on self-efficacy's construct validity in problem gambling, the current study examined the self-efficacy theory in a group of problem gamblers. Problem gamblers who initiated a quit attempt in 1998-1999 were re-interviewed at a 60 month follow-up. Self-efficacy theory has never been established in the problem gambling population and this longitudinal study provides initial support for the construct validity of self-efficacy with problem gamblers.

Although problem gambling is classified according to the Diagnostic and Statistical Manual-IV-TR (American Psychiatric Association [APA], 2000) as an Impulse Control Disorder Not Elsewhere Classified, researchers have recommended that problem gambling be conceptualized as an addiction (Neighbors, Lostutter, Larimer, & Takushi, 2002). Since the examination of self-efficacy in problem gambling is in its' infancy, the literature review for this project delineates the role of self-efficacy in the cessation of smoking, alcohol use, and drug use. Specific hypotheses regarding self-efficacy and gambling behaviour are generated from the theories of self-efficacy.

Social Cognitive Theory

Self-efficacy Theory is derived from Bandura's Social Cognitive Theory (previously named Social Learning Theory), a broad theory that explains much of human behaviour (Bandura, 1969, 1986, 1997; Bandura, Adams, & Beyer, 1977). The major tenet of Social Cognitive Theory is that behaviour is a result of "external

stimulus events, internal processing systems and regulatory codes, and reinforcing response-feedback systems” (Bandura, 1969, p.19). The theory incorporates social cognitive factors with the principles of learning to explain development, maintenance, and change of behaviours. Maisto, Carey, and Bradizza (1999) have identified four principle constructs associated with the Social Cognitive Theory: differential reinforcement, vicarious learning, reciprocal determinism, and cognitive processes. The theory asserts that these core constructs determine the course and outcome of behaviour and behaviour change.

Differential reinforcement explains the variability of an individual’s behaviour as a result of the different consequences associated with various settings. For example, different consequences may result from situations in which a gambler’s spouse is present versus absent. The presence of a disapproving spouse may lead to negative outcomes (e.g., nagging, blaming, arguing) and could decrease gambling behaviour in that situation whereas the absence of this spouse may not affect the gambling behaviour or may increase it. The well-established concept of differential reinforcement encompasses both positive and negative reinforcement as well as punishment. The various forms of reinforcement may be implemented by others or initiated by the individual and are highly dependent on the setting (Bandura et al., 1977; Bandura, 1997).

Vicarious learning, otherwise known as modeling, is learning through observing other individuals experience consequences. An individual may increase or decrease their behaviour based on the simple observation of the positive or negative

consequences of another person's behaviour. Much of human learning is said to be a result of modeling (Bandura et al., 1977; Bandura, 1997).

The third construct in Social Cognitive Theory, reciprocal determinism, describes the tri-directional influence among an individual's cognitions, behaviours and environments. These factors are inter-related and influence each other to varying degrees. An individual who gambles to relieve a depressed mood, which is a result of the gambling behaviour in the first place, is exhibiting the process of reciprocal determinism.

Cognitive processes are important because they are viewed as mediators of behaviour (Bandura et al., 1977). In this context, a mediator specifies "how external physical events take on internal psychological significance" (Baron & Kenny, 1986, p. 1176). Three related cognitive processes are deemed to be important mediators of behaviour and behaviour change: outcome value, outcome expectancy and self-efficacy. Outcome value is the perceived importance associated with the consequence of the behaviour. Outcome expectancy is defined as a person's belief that consequence will occur upon performing an action. Self-efficacy is considered to be independent from outcome expectancy and outcome value, and is defined as a person's belief in their ability to perform an action in a given situation. Self-efficacy is thought to exert the strongest influence on behaviour and behaviour change (Bandura et al., 1977; Bandura, 1997).

Sources of Self-efficacy

Four sources of self-efficacy are hypothesized to exert influence on behaviour to varying degrees: performance experience, vicarious experience, verbal persuasion,

and physiological arousal/affective state (Bandura, 1969, 1986). Performance experience is thought to have the most significant influence on self-efficacy. Here, an individual's history of prior successes or failures influences their belief in their ability to perform the behaviour in the future. This evaluation of past performance is predicted to have the most influence on one's level of confidence in their ability to perform the behaviour in the future.

Vicarious experience (observational learning) is the second most influential source of self-efficacy. Observing another individual experience consequences of their behaviour can directly influence one's own performance. The strength of influence depends on the perceived similarities between the observed model and oneself, the assumed power the model holds, the diversity of models observed, and the similarity of the behaviour being performed (Bandura, 1969, 1986).

Self-efficacy's third source comes from verbal persuasion. A number of factors determine the strength of influence. As the expertise, credibility and attractiveness of the persuader increases, so does an individual's self-efficacy. Research suggests that verbal persuasion exerts moderate levels of influence on self-efficacy (Maddux, 1991).

Finally, physiological arousal/affective state includes the influences of both physiological and affective states. When behaviour becomes associated with physiological arousal, an individual's confidence regarding their ability to perform that behaviour becomes influenced by their physiological state. This applies to both negative and positive physiological states, where self-efficacy to perform is increased or decreased as a result of experiencing that state. It is theorized that mood plays a

similar role in self-efficacy judgments. Negative mood states decrease self-efficacy ratings whereas positive mood states increase them. Although emotional arousal exerts relatively less influence on self-efficacy judgments, it still plays a significant role (Bandura, 1997).

Self-efficacy and the Addictions

Social Cognitive Theory offers a theoretical approach to understanding behaviour and behaviour change. Self-efficacy has been examined in various areas including athletic performance, pain management, eating disorders, and phobias, all of which have found empirical support for the idea that the construct is an important predictor of future performance (Bandura, 1997). Research in the area of addictions has generally supported the role of self-efficacy in changing addictive behaviours.

A close examination of the literature reveals some inconsistent findings with respect to the predictive nature of self-efficacy. Both pre-treatment and post-treatment self-efficacy ratings have been examined as outcome predictors in the cessation of smoking, alcohol and drug use. Smoking cessation post-treatment ratings, but not pre-treatment, were predictive of outcome (Baer, Holt, & Lichtenstein, 1986; Condiotte & Lichtenstein, 1981). Conversely, for marijuana cessation, pre-treatment ratings of self-efficacy were more predictive of outcome than post-treatment ratings (Stephens, Wertz, & Roffman, 1993; Stephens et al., 1995). Finally, both pre- and post-treatment self-efficacy ratings were able to predict drinking behaviour (McKay, Maisto, & O'Farrell, 1993; Rychtarik, Prue, Rapp, & King, 1991; Solomon & Annis, 1990).

Despite inconsistencies in the predictive power of pre- and post-treatment self-efficacy ratings, it is clear that self-efficacy is moderated by treatment

involvement. Since self-efficacy is influenced by the treatment experience, elevated pre-treatment ratings have been associated with a failure to acknowledge a need for treatment or unrealistic expectations regarding one's abilities to quit (Burling, Reilly, Moltzen, & Ziff, 1989; McMahon & Jones, 1992; Stephens et al., 1995). In light of these findings, end of treatment self-efficacy ratings may provide a better estimate of future behaviour.

The reported time frame associated with the predictive value of self-efficacy is another inconsistency in the addiction research. For smoking cessation, reports that self-efficacy is a predictor of relapse is consistent in samples of self-quitters, but varies in samples of treatment seekers. For individuals who quit on their own, the predictive ability of self-efficacy spans across short (3 - 6 months) and long-term (6 - 12 months) intervals. Treatment seekers' reports of higher confidence predicted long-term smoking behaviour but failed to predict short-term behaviour (Ockene et al., 2000). Additional studies of smoking cessation in treatment seekers have found that self-efficacy is a predictor of outcome across 3 and 6 month time intervals (Conditte & Lichtenstein, 1981), but not 1 year (McIntyre, Lichtenstein, & Mermelstein, 1983).

Results for alcohol are more consistent, with the predictive window ranging from 3 months (Solomon & Annis, 1990) to 3 years (Project Match Research Group, 1998). The role of self-efficacy in marijuana cessation has received little attention, but one study found self-efficacy to predict outcome across a 12 month period (Stephens et al., 1995).

In addition to the above discrepancies, the operational definitions of self-efficacy vary from study to study and may account for some of the variance in the

literature. In the alcohol literature, self-efficacy has been commonly defined in one of two ways: as one's confidence in their ability to *abstain from drinking* in different situations (Condiotte & Lichenstein, 1981; DiClemente, Carbonari, Montgomery, & Hughes, 1994) or as one's confidence in their ability to *resist drinking heavily* in different situations (Annis & Davis, 1988). The difference between these two concepts may lie in their predictive ability, as determined by the definition of abstinence or reduction. That is, self-efficacy measured as confidence in one's ability to abstain from drinking should predict abstinence. Similarly self-efficacy measured as confidence in one's ability to resist drinking heavily should predict reduction in alcohol use (Maisto et al., 1999).

Another factor that may foster research inconsistencies is measurement. Self-efficacy has been measured as a single aggregate confidence rating reflecting a global measure of self-efficacy (e.g., How confident are you that you will not drink in the next month?) or, more commonly, as an average of a number of confidence ratings across different situations. Although some studies on smoking cessation have found that self-efficacy represents a uni-dimensional construct (Baer et al., 1986), the situational ratings method is preferred since it offers the more reliable gauge of self-efficacy and is concordant with the hypothesized context dependent nature of self-efficacy (Bandura, 1986, 1997).

Finally, different conceptualizations of outcome may add to discrepancies in the literature. Three popular outcome measures have been used in addiction research: abstinence, frequency of use, and change in behaviour over time. Such measurement differences are important to consider when reviewing the literature. Change in

behaviour may reflect the most sensitive measure of self-efficacy's role in recovery from addictions (Bandura, 1986, 1997).

Self-efficacy Theory and Problem Gambling

On the basis of Bandura's theory, the relationship between self-efficacy and problem gambling behaviour is depicted in Figure 1. Past performance exerts the strongest influence on gambling abstinence self-efficacy (the belief that one is capable of abstaining from gambling), with abstinence increasing levels of self-efficacy and gambling behaviour decreasing levels of self-efficacy. Vicarious experience, verbal persuasion, and physiological arousal/affective states are seen as less influential. Gambling behaviour originates as a result of past performance, vicarious experience, verbal persuasion and affective states and is mediated by levels of self-efficacy. Outcome expectancy and outcome value are additional mediators of gambling behaviour. Outcome expectancy mediates gambling behaviour to a lesser extent than self-efficacy and is seen as a related, but independent construct. Outcome value is the least influential mediator of gambling behaviour.

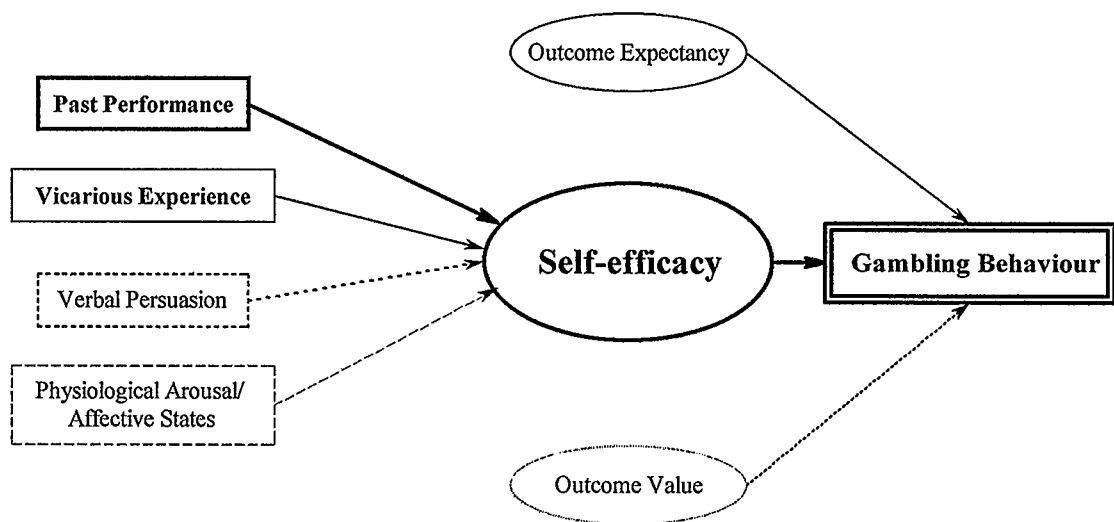


Figure 1. Hypothesized relations of self-efficacy and gambling behaviour according

to the Social Cognitive Theory. The strength of the relationship is portrayed by line thickness.

Self-efficacy and Problem Gambling

Few studies have examined self-efficacy and problem gambling behavior. Hodgins, Peden, and Makarchuk (in press) examined the psychometric properties of the newly developed Gambling Abstinence Self-efficacy Scale (GASS, Appendix A) in order to more thoroughly investigate self-efficacy among problem gamblers. We found that self-efficacy ratings predicted the number of days gambled at 12 months, an effect that was only found for individuals not receiving treatment at the time of the self-efficacy rating. Specifically, higher ratings (which reflect higher confidence to abstain) on the GASS total score and three of the four subscale scores (winning/external situations, positive mood/testing/urges and social factors, but not negative emotions) predicted fewer days gambled during the 12 month follow-up period. That this finding only held true for individuals not involved in treatment provides initial support for the contention that gambling abstinence self-efficacy is moderated by the treatment experience.

Ladouceur and his colleagues (2001) examined 66 pathological gamblers receiving cognitive treatment that included two main components: cognitive corrections and relapse prevention. Their measures included an average rating of perceived self-efficacy in two self-identified high-risk situations. Self-efficacy was found to increase over the course of treatment, a change that was maintained at 6 and 12 month follow-ups, supporting the notion that treatment significantly impacts self-efficacy ratings in pathological gamblers.

Self-efficacy and Construct Validity

Construct validity reflects the extent to which the measure of a construct corresponds with its' theorized relationships (Guion, 1980). All types of validity (discriminant, predictive, concurrent, etc.) can be used to support the validity of a construct and it is recommended that multiple validity evaluations be used when testing the hypothesized relations. The construct validity of self-efficacy in relation to addictive behaviours has received considerable attention. Specifically, construct validity of self-efficacy has gained support through predictive, concurrent and discriminant validity studies. In order to establish that self-efficacy theories hold with a behaviour, research is needed.

Theory suggests that: self-efficacy predicts latency to relapse; self-efficacy predicts relapse behaviour and is a mediator between past performance and future behaviour; past performance and negative affect influence ratings of self-efficacy, with past performance exerting more influence on self-efficacy judgments than negative affect; self-efficacy is independent from outcome expectancy; self-efficacy is a more powerful influence on behaviour than outcome expectancy; self-efficacy is situation specific (Bandura, 1986, 1997).

Latency to Relapse

The ability of a construct, such as self-efficacy, to predict the amount of time until an individual is likely to relapse is of great importance (e.g., for planning relapse prevention). The smoking literature has consistently supported self-efficacy's time sensitive nature. For example, Condiotte and Lichtenstein (1981) found that post-treatment self-efficacy ratings in a group of smokers who quit, predicted their length

of abstinence. Participants with higher ratings of self-efficacy were more likely to achieve abstinence for a longer period of time than participants with lower ratings.

Similar results have been found with alcohol use. Allsop, Saunders, and Phillips (2000) examined the role of self-efficacy in problem drinkers attending an outpatient treatment center. Self-efficacy ratings at end of treatment predicted drinking outcome at 6 months, as well as time to relapse. Those with higher self-efficacy at the end of treatment were able to maintain abstinence longer than those with lower self-efficacy ratings. In a sample of inpatient alcoholic males, Rychtarik et al. (1991) found that levels of self-efficacy at intake predicted time to relapse, with those reporting low self-efficacy at intake at increased risk for relapsing sooner. End of treatment self-efficacy ratings did not predict latency to relapse. Similar findings were reported by Greenfield and colleagues (2000). Self-efficacy ratings at admission to an alcoholic inpatient treatment unit were predictive of time to first drink and time to first relapse. Patients with higher ratings of self-efficacy took longer to relapse and relapsed fewer days than patients with lower self-efficacy ratings. The consistent finding that an individual's level of self-efficacy is able to predict latency to relapse has important implications for treatment planning and delivery.

Predicting Outcome Behaviour

The study of self-efficacy and outcome behaviour is an important concept that has received considerable attention in the literature. McIntyre et al. (1983) examined end of treatment self-efficacy ratings for smoking cessation and found strong correlations with smoking status (abstinent/smoking) at 3 and 6 months but not 12 months. Other studies have found support for both short-term and long-term outcome.

Ockene and colleagues (2000) reviewed studies where individuals quit smoking, either self-initiated or through treatment. They identified 21 studies where self-efficacy predicted relapse in smoking and maintenance of abstinence behaviour. For self-initiated quitters, higher confidence was related to short-term (6 months) and long-term (12-24 months) maintenance of smoking abstinence. For treatment seekers, self-efficacy ratings predicted long-term maintenance only.

Research into the predictive utility of self-efficacy ratings for alcohol relapse has found mixed support. Burling et al. (1989) examined inpatient male substance abusers and found that post-treatment self-efficacy ratings were not predictive of follow-up performance. However, they did find that patients with larger changes in self-efficacy ratings over the treatment period showed greater abstinence rates 6 months later. In another study conducted by Rychtarik et al (1991), a group of inpatient male alcoholics rated their level of self-efficacy at intake and discharge. Although discharge ratings of self-efficacy were not predictive of relapse, lower self-efficacy ratings at intake were predictive of relapse at 6 and 12 months. In contrast, Noone, Dua, and Markham (1999) and others (e.g., Allsop et al., 2000; Long, Williams, Midgley, & Hollin, 2000) have found that self-efficacy ratings of alcoholic inpatients at discharge were predictive of 6 and 12 month drinking outcome. Specifically, higher post-treatment self-efficacy ratings predicted less alcohol use.

Aftercare seems to play an important role in self-efficacy's predictive utility for outpatient alcoholics. McKay et al. (1993) found that for male alcoholics not attending aftercare, low post treatment self-efficacy ratings predicted frequency of drinking days. Men attending aftercare treatment did not show this effect. Another

study found post-treatment self-efficacy ratings to be predictive of 1 and 3 year outcomes. Specifically, both drinking frequency and drinking intensity were predicted by self-efficacy at 1 year, but only drinking intensity was predicted at 3 years (Project Match Research Group, 1998).

Self-efficacy's Mediator Role

The role of self-efficacy as a mediator of outcome behaviour has received mixed support. A mediator accounts for or explains the correlation between a predictor variable and an outcome variable (Lindley & Walker, 1993). The self-efficacy theory proposes that variables influencing outcome (e.g., past performance and negative affective states) are mediated through self-efficacy. Gwaltney and colleagues (2001) found that aggregate ratings of self-efficacy, as well as ratings across a variety of situations, were predictive of future relapse, even when current smoking behaviour was accounted for. Controlling for current behaviour is important because self-efficacy is proposed to be more than just an indication of current behaviour.

Other studies have found partial support for a mediator role. Shiffman et al. (2000) examined the relationship between self-efficacy ratings and relapses in smokers attempting to quit through a smoking cessation program. They found that ratings of self-efficacy predicted whether a lapse would lead to a relapse, even when controlling for baseline self-efficacy and current smoking status. In another study, client's self-efficacy ratings at the end of a smoking treatment program were predictive of smoking status six months later. When smoking status at the time of self-efficacy ratings was accounted for, predictive power was preserved, but to a

lesser extent. The authors found that ratings of self-efficacy two months after treatment were the strongest predictors of outcome behaviour (Baer et al., 1986).

In contrast, Garcia, Schmitz, and Doerfler (1990) did not find support for a mediator theory in a sample of undergraduate students who initiated a smoking quit attempt on their own. They determined that self-efficacy and prior smoking accounted for future smoking behaviour equally well. That the undergraduate sample was comprised of relatively newer smokers compared to most clinical samples may account for the lack of differences.

For marijuana cessation, self-efficacy was found to partially mediate future use. Stephens et al. (1995) examined 212 men and women seeking treatment for marijuana use and examined whether self-efficacy ratings predicted future use. End of treatment self-efficacy ratings, but not pre-treatment ratings, predicted outcome above and beyond current performance and other source variables (e.g., weekly use, coping, temptation, perceived stress, contact with users). However, the source variables did account for a portion of the variance at 1, 3 and 6 month follow-ups. An earlier study by Stephens et al. (1993) did not find support for a mediator theory. Using a similar sample of outpatients, pre-treatment self-efficacy ratings predicted outcome (frequency of marijuana use), but did not mediate the relationship between prior use and outcome.

Past Performance and Negative Affect

The hypothesis that past performance is the most influential source of self-efficacy has received mixed results. DiClemente (1981) examined individuals who quit smoking either on their own or by seeking treatment. Both self-quitters and

treatment seekers who remained abstinent at 5 months had higher self-efficacy scores than individuals who had relapsed. McIntyre et al. (1983) examined self-efficacy ratings for smoking cessation and noted that smoking during the treatment phase was related to lower self-efficacy scores at the end of treatment. In contrast, Baer et al. (1986) examined confidence ratings among individuals who attended a smoking cessation program, and found that self-efficacy ratings did not increase during periods of abstinence.

Burling and his colleagues (1989) also found support for the influence of past performance on levels of self-efficacy in a sample of inpatient drug and alcohol abusers. Self-efficacy ratings were higher for individuals who maintained abstinence over the 6 month follow-up period than individuals who relapsed during that time.

Although physiological and affective states exert the least influence on ratings of self-efficacy, the hypothesis that ratings of self-efficacy are influenced by negative emotional states is well supported. Stanley and Maddux (1986) have supported the role of depressed mood on self-efficacy ratings using laboratory manipulations of affective states. The relationship that depressed mood led to decreased self-efficacy ratings held true for both specific ratings across situations and global ratings of self-efficacy. Haukkala, Uutela, Vartiainen, Mcalister and Knekt (2000) also examined self-efficacy in a group of current smokers and found that those with higher depression scores had lower self-efficacy scores.

Outcome Expectancy

An important principle of self-efficacy theory is the distinction of self-efficacy expectancy from outcome expectancy (Bandura, 1986). Although the theory that

these constructs are independent has been debated, the idea has been generally supported in addiction research. Maddux, Sherer, and Rogers (1982) found support for the distinction between self-efficacy and outcome expectancy in a nonclinical sample by using verbal persuasion to manipulate self-efficacy and outcome expectancy regarding an individual's interpersonal skill. Participants were presented with written communications that expressed ease or difficulty of skill (high or low self-efficacy) and effectiveness of behaviour in eliciting an outcome (outcome expectancy). Increased ratings of outcome expectancy but not self-efficacy, led to increased intention to perform the behaviour. They also determined that outcome expectancy influenced levels of self-efficacy. Similarly, in student samples, the relationship between drinking refusal self-efficacy and outcome expectancy has been examined (Baldwin, Oei, & Young, 1993; Oei & Burrow, 1995). Both studies found these constructs to be independent from each other, further supporting the distinction between self-efficacy and outcome expectancy. Consistent with this, Solomon and Annis (1990) examined the relationship between self-efficacy and outcome expectancy in alcoholic clients undergoing a treatment program. Self-efficacy was predictive of 3 month drinking consumption while outcome expectancy was not. These findings support the assumption of Bandura's theory of self-efficacy: outcome expectancy accounts for less variance in the prediction of outcome than self-efficacy.

The smoking literature also supports a distinction between the constructs of self-efficacy and outcome expectancy. The relationship between self-efficacy and temptations was examined in a group of individuals quitting smoking (Zenter & Borland, 1995). Outcome expectancies are often conceptualized as temptations, as

they are closely related constructs (Stephens et al., 1995). Zenter and Borland (1995) concluded that self-efficacy and temptations played different roles in the quitting process and found a moderate correlation between the two constructs.

Situation Specificity

The situation-specific nature of self-efficacy has been debated in research on smoking cessation. Condiotte and Lichtenstein (1981) examined self-efficacy in participants attending a smoking cessation treatment program and were the first researchers to find that low self-efficacy ratings at post-treatment predicted the situations where relapse occurred. Baer and colleagues (1986) failed to replicate this finding. In a more recent study, Gwaltney et al. (2001) examined situation specific self-efficacy ratings in participants receiving treatment for smoking cessation. Self-efficacy ratings were context specific and lower confidence ratings tended to be associated with negative affect situations. Similarly, Gwaltney et al. (2002) found that self-efficacy ratings distinguished between situations where participants experienced a relapse, a temptation, or no temptation. That ratings of self-efficacy were able to distinguish between relapses and temptations is particularly notable. Situations where relapse occurred were associated with lower ratings of self-efficacy than situations where a temptation had occurred. Garcia et al. (1990) found the same results in a sample of self-initiated quitters and concluded that self-efficacy ratings for smoking abstinence were lowest for subsequent high-risk relapse situations.

The situation specific nature of self-efficacy has also received support in the alcohol and drug literature. For example, Burling et al. (1989) found that drug and alcohol inpatients with lower ratings of self-efficacy (reflecting poor confidence to

abstain) at intake were better able to predict the situations where relapse occurred than patients with higher intake ratings of self-efficacy. High pre-treatment ratings may be related to unrealistic expectations regarding treatment efficacy whereas lower pre-treatment self-efficacy ratings may be an indicator of awareness of high-risk situations.

Self-efficacy and Stages of Change

The Transtheoretical Model is a descriptive model of how people change health related behaviours (Prochaska & DiClemente, 1983). The model considers self-efficacy to be an intervening variable important in effecting behaviour change. Consistent with the model, self-efficacy has been found to differ across the stages of change in addictive behaviours. Herrick, Stone, and Mettler (1997) found that individuals in the maintenance and action stage had higher ratings of self-efficacy than individuals in the precontemplation and contemplation stages. Segan, Borland, and Greenwood (2002) examined several constructs pivotal to movement through the stages of change in a group of smokers attempting to quit. Self-efficacy was the only construct related to short-term abstinence. Support for the relationship between stages of change and self-efficacy also comes from the alcohol literature. Together, stages of change and self-efficacy were found to distinguish drinking outcome status following treatment (Carbonari & DiClemente, 2000).

Hypotheses

All hypotheses are derived from Bandura's self-efficacy theory and have been empirically examined in other addictions. Hypotheses are specific to problem gambling behaviours.

- 1) Ratings of self-efficacy will predict latency to gamble. Specifically, individuals with lower self-efficacy ratings will relapse sooner than individuals with higher self-efficacy ratings.
- 2) Low ratings of self-efficacy will predict higher levels of future gambling behaviour, while high ratings of self-efficacy will predict lower levels of gambling behaviour.
- 3) Self-efficacy will mediate the relationship between past performance and gambling behaviour.
- 4) Past performance is expected to exert greater influence on self-efficacy judgments than negative emotional states. Thus, both past performance and negative emotional states are expected to predict self-efficacy ratings.
- 5) Self-efficacy is expected to be independent from outcome expectancy, with self-efficacy emerging as a stronger predictor than outcome expectancy.
- 6) Situations in which problem gamblers identify low levels of abstinence self-efficacy will predict the situations in which relapse occurs.

Method

The Present Study

A study conducted from 1998-2001 identified the critical dimensions of relapse to gambling by following a group of pathological gamblers for a one year period (Hodgins & el-Guebaly, 2004; Hodgins et al., 2001). The current study re-interviews this group of gamblers and uses portions of the existing longitudinal information along with new follow-up information.

Participants

Participants were 101 men and women who responded to newspaper advertisements (63%), flyers/posters (19%), radio and television announcements (13%), and word-of-mouth campaigns (5%) that promoted a research study looking at the relapse process in individuals who had recently quit gambling. A research assistant provided information about the study and screened for eligibility over the phone. Criteria were: South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987, Appendix B) score greater than 4; no gambling for the last two weeks, but some gambling in the last month; willing to participate in a comprehensive personal interview and three follow-up interviews conducted at 3, 6 and 12 months after the initial interview; willing to provide the names and phone numbers of three individuals (e.g., family members, friends, co-workers) to be contacted as collaterals for gambling verification and location purposes.

The final sample, recruited over a 16 month period, was comprised of 36 females and 65 males with a mean age of 39 years ($SD = 10.1$, Range 19-77). The majority of the sample was Canadian (76%), French Canadian (8%), and Aboriginal (2%), with the other 14% comprising ethnic groups such as East Indian, German, and Japanese. Over one third of the sample had never been married (38%), 21% were married, 8% common-law, 8% separated, and 26% divorced. Most of the participants had some post secondary education (66%, $M = 1.79$, $SD = 2.13$). Fifty-five percent were employed full-time, 12% part-time, 3% homemakers, 2% students, 2% retired, 4% disability, and 22% were unemployed. Participants were abstinent from gambling for a mean of 19 days ($SD = 21$) at the initial interview.

Most participants reported a previous quit attempt (75%, $Mdn = 3.0$) and half had sought prior treatment for their gambling problems. One quarter (25%) of participants were currently in treatment for gambling with 60% receiving individual treatment, 44% attending Gamblers Anonymous, 24% participating in group treatment, and 8% receiving treatment in a residential facility. Additional information on gambling involvement, including age of problem onset, mean SOGS score, and types of gambling activities that were noted as problematic are reported in Table 1.

Participants were questioned regarding their goal. Thirty-three percent stated that they wanted to quit all forms of gambling, while 67% had a goal to quit only the types of gambling that were causing problems. Confidence to achieve the goal over time was obtained using a scale of 0 to 10 (0 = not at all confident to 10 = extremely confident). Participants were the most confident of achieving the goal for the next week ($M = 8.0$, $SD = 2.6$), less confident for the next six months ($M = 6.9$, $SD = 2.7$), and the least confident for the next year ($M = 6.2$, $SD = 3.8$).

Procedure

Initial Interview

Interviews were conducted in person at a local hospital where informed consent was obtained. Demographic information, gambling history, gambling activities, and gambling frequency were collected during the initial assessment. Past and current treatment for gambling problems was recorded and negative affect was assessed using the Beck Depression Inventory (BDI; Beck et al., 1961).

Participants completed self-report questionnaires regarding their confidence in their ability to abstain from gambling (GASS) and temptation to gamble across a

Table 1

Gambling Involvement Reported by Participants (N=101)

Age of onset of gambling problem		
<i>M</i>		34
<i>SD</i>		11
South Oaks Gambling Screen score		
<i>M</i>		12
<i>SD</i>		3.4
One month prior to quit attempt		
Average days gambled per month		13 (<i>SD</i> = 9)
Average amount gambled per day		\$224 (<i>SD</i> = 403)
Type of gambling causing problems (%)		
VLT's		86
Lottery		82
Scratch tickets		70
Casinos		50
Slot machines		42
Raffle/fund raiser		39
Bingo		33
Card games		29
Games of skill		19
Nevada tickets		19
Keno		18

Sports select	14
Sport pools	14
Informal sports betting	14
Horse/dog racing	10
Investments	10
Sports betting with a bookie	4
Other	3

number of different situations (Temptations for Gambling Scale, TGS; Hodgins, Holub, & Peden, in press, Appendix C). The last relapse that the participant experienced was recounted and participants completed the Reasons for Gambling Scale (RGS; Hodgins et al., 2001, Appendix D). A relapse was defined as resumption of gambling after a two-week period of no gambling. A battery of other measures was also administered as part of the larger study (see Hodgins et al., 2001 for details). Participants were reimbursed \$11.00 for parking expenses before leaving.

3, 6, and 12 Month Follow-up Interviews

Follow-up interviews took place in person or were conducted over the telephone if a face-to-face interview was not possible. Participants completed an interview and the same assessment measures at 3, 6 and 12 months. Participants recalled the type of gambling, number of days gambled, and amount gambled per day since the last interview with the aid of the Time Line Follow Back method (TLFB; Sobell & Sobell, 1992). The type and frequency of treatment sought over the follow-up period was noted. The BDI was re-administered to identify negative affect over the follow-up period. Participants also completed the GASS and TGS. For each relapse identified a RGS was also given.

In addition to the \$11.00 reimbursement for parking expenses, participants received a \$20.00 gift certificate to a local grocery market upon completion of 3 and 6 month interviews, and a \$30.00 gift certificate at the 12 month interview. This incentive was offered to improve the low follow-up rates generally attained by researchers in the field of addictions (Ladouceur et al., 2001).

60 month Follow-up Interview

Participants from the original study signed a consent form, agreeing to be contacted in the future for a follow-up interview. Of the 101 participants, 2 dropped out and 1 was deceased, leaving a potential 98 participants to follow-up. Each participant received a \$50.00 gift certificate to a local grocery market.

Following informed consent, participants were assessed face-to-face (or over the telephone if face-to-face was not possible) as part of a larger follow-up study on relapse in pathological gambling. All measures used in the initial study were used in the current follow up study to allow for continuity among measures used in time sensitive analysis. For example, the GASS was used to examine ratings of self-efficacy in problem gamblers and was also used in the proposed follow-up to identify current self-efficacy ratings. A research assistant used the TLFB method to help participants' recall the type of gambling, number of days gambled, amount gambled per day, as well as treatment involvement (type, frequency) since the last interview. Participants rated their confidence to abstain from gambling on the GASS and their current temptations using the TGS. The Gambling Readiness to Change scale (GRTC; Neighbors et al., 2002, Appendix E) was administered in order to classify individuals according to the stages of readiness to change. The RGS was completed to capture reasons for the most recent relapse.

Instruments

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The BDI, a widely used 21-item self-report questionnaire, provides an index of the severity of negative affect and has been extensively evaluated in general

clinical samples. Reports of the concurrent validity with general clinical samples have indicated good agreement with clinicians' ratings of depression (Beck, Steer, & Garbin, 1988). The BDI was totaled and used as a measure of current negative affect (i.e., in the last week).

South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987). The SOGS is a 20-item self-report instrument that provides a measure of gambling severity based on DSM-III criteria for pathological gambling. In this sample, classification of problem gamblers by the SOGS correlated highly with DSM-IV classified problem gamblers ($\kappa = .89$) (see Hodgins et al., 2001). The SOGS is extensively used to screen non-clinical and clinical populations for pathological gambling. A score of 5 or greater indicates probable pathological gambling whereas scores of 3 or 4 may indicate sub-clinical problem gambling. Both lifetime and past year versions have demonstrated satisfactory validity (internal consistency = .69) and good test-retest reliability ($\alpha = .86$) among gambling treatment samples (Lesieur & Blume, 1987; Stinchfield, 2002).

Time Line Follow Back (TLFB; Sobell & Sobell, 1992). The Time Line Follow Back method was originally developed to assist in the retrospective recall of the frequency and amount of alcohol consumption over a period of time. This instrument has been modified for use with other addictive behaviours and has proven a reliable and valid instrument. The TLFB method has recently been validated with samples of pathological gamblers for time periods ranging from 6 months (Hodgins & Makarchuk, 2003) to 1 year (Weinstock, Whelan, & Meyers, 2004). The frequency of

gambling behaviour and amount of money spent are two measures covered by the TLFB method for gambling behaviour.

Gambling Abstinence Self-efficacy Scale (GASS; Hodgins, Peden, et al., in press). This 24-item¹ scale was derived from the Alcohol Abstinence Self-efficacy Scale (DiClemente et al., 1994) and measures a person's confidence in their ability to abstain from gambling across a variety of situations. The GASS uses a 6-point Likert scale of 0 - 5 (0 = not at all confident to 5 = extremely confident). Four subscales have been identified: 1) winning/external situations, 2) negative emotions, 3) positive mood/testing/urges, and 4) social factors. Initial studies (Hodgins, Makarchuk, & Peden, 1999) indicate good internal ($\alpha = .93$) and retest reliability (ICC = .86) for the GASS. The *Temptations for Gambling Scale* (TGS; Hodgins, Holub, et al., in press) and *Reasons for Gambling Scale* (RGS; Hodgins et al., 2001) parallel the GASS by using the same 24 items to measure temptations for gambling and reasons for gambling. A similar 6-point Likert scale is used with the TGS and RGS.

The Gambling Readiness to Change Scale (GRTC; Neighbors et al., 2002). This 9-item scale, modeled after Prochaska and DiClemente's (1983) model of stage of change, captures three of the stages of readiness to change: precontemplation, contemplation, and action. Items are endorsed using a Likert scale of 1 (strongly disagree) to 5 (strongly agree). The GRTC was found to misclassify nonproblem gamblers in the precontemplation stage and therefore should only be used with individuals who experience at least subclinical problems with their gambling.

¹ Although the GASS contains 24 items, only 21 items are used to calculate the subscales and total score.

Adequate reliability ($\alpha = .81$) and convergent validity was demonstrated for this measure in a student sample.

Results

Missing Data and Dropouts

Follow up rates for the 3, 6, and 12 month interviews were 71%, 72% and 81%, respectively. A portion of participants were able to provide information regarding missed assessments, and therefore follow-up data are available for 83% of participants at 3 months and 80% at 6 months. The 60 month follow-up rate to date is 47%². Two participants were interviewed at the 60 month follow-up for the first time since the initial interview. Since the TLFB method is only validated for up to one year (Weinstock et al., 2004), the information they provided was not used to fill in missing information as was done over the 12 month follow-up period. Missing data was minimal over all follow-up periods and dealt with by prorating sub-scales on instruments such as the GASS, TGS, and RGS.

Those participants who completed the 12 and 60 month follow-ups were compared to those participants who did not. Table 2 displays the means and standard deviations for these groups for the variables compared. Chi-square analysis and t-tests revealed no significant differences (all $p > .05$).

At the initial interview, it was required that all individuals had quit gambling for at least two weeks. It was recognized that not all individuals would be in the same stage of change when re-interviewed at the 60 month follow-up. According to the

² It is estimated that 60% of the sample will be followed by December 2004.

Table 2

Demographic Characteristics and Gambling Involvement of Participants Followed and Not Followed.

		Followed at 12 months (n = 80)	Not followed at 12 months (n = 21)	Followed at 60 months (n = 47)	Not Followed at 60 months (n = 54)
% Female		38	29	40	31
% Married/Common law		30	24	21	35
% Full/part-time employment		66	71	66	69
Age	<i>M</i>	40	37	40	38
	<i>SD</i>	9.3	12.7	9.5	10.5
% Post secondary education		68	62	68	65
Age of onset of gambling problem					
	<i>M</i>	31	31	32	30
	<i>SD</i>	12	14	12	12
SOGS	<i>M</i>	12.4	11.2	11.8	12.4
	<i>SD</i>	3.4	3.1	3.3	3.4
% Previous quit attempt		79	62	74	76
% Past gambling treatment		51	43	49	50
% Current gambling treatment		26	19	23	26

One month prior to quit attempt:

Average days gambled
per month

<i>M</i>	13.6	11.9	12.8	13.7
<i>SD</i>	9.2	8.3	9.6	8.6

Average amount gambled
per day

<i>M</i>	\$221	\$232	\$212	\$233
<i>SD</i>	421	335	338	452

Note. SOGS = South Oaks Gambling Screen

GRTC, 7% of participants were classified in the precontemplation stage (GASS score at 60 month follow-up - $M = 35.5$, $SD = 23.3$, $n = 2$), 36% were in the contemplation stage (GASS score at 60 month follow-up - $M = 47.3$, $SD = 25.6$, $n = 16$), and 43% were classified as in the action stage (GASS score at 60 month follow-up - $M = 64.2$, $SD = 25.4$, $n = 19$). The other 14% were classified as in the maintenance stage given that they had not gambled in the last 6 months (GASS score at 60 month follow-up - $M = 89.2$, $SD = 15.9$, $n = 6$). The GASS scores are significantly different among the stages, $F(3, 42, n = 44) = 5.16$, $p = .004$. These results are consistent with the findings of Herrick et al. (1997) who found that smokers in precontemplation and contemplation had lower self-efficacy ratings than smokers in the action and maintenance stages.

Statistical Analyses

All data analyses were conducted using SPSS 11.0 for Windows. For each hypothesis, data was screened for accuracy of input, missing data, linearity and homoscedasticity, normal distributions, both univariate and multivariate outliers, and multicollinearity and singularity where appropriate (Tabachnick & Fidell, 2001). Failure of variables to meet the above assumptions is outlined for each hypothesis.

Each analysis made use of the largest sample possible, contingent on valid information provided by participants at the required time periods. For example, for an individual's information to be included in the analysis of self-efficacy's source variables, they must have completed the BDI at the 3 month follow-up, provided valid information regarding gambling behaviour over the 3 month follow-up, and completed the GASS at the 3 month follow-up.

For predictive analysis involving self-efficacy, participants with initial total confidence scores of 105 ($n=5$) were excluded. As noted earlier, such ceiling ratings have been associated with unrealistic beliefs about quitting and are not reliable for predicting behaviour (Burling et al., 1989; McMahon & Jones, 1992; Stephens et al., 1995). Additionally, since treatment is a hypothesized moderator of self-efficacy and was found to moderate the relationship between self-efficacy and outcome in this sample (Hodgins, Peden, et al., in press), only those individuals not receiving treatment were included in predictive analysis ($n=76$).

Hypothesis 1: Latency to Gamble

A Cox proportional hazards regression model (survival analysis) was used to examine the hypothesis that self-efficacy predicts latency to relapse. Seventy-five cases were included in the analysis, 60 relapsed and 15 were censored (14 due to incomplete follow-up by 12 months and one individual did not experience relapse by the time of the last interview). Status was coded 1 for relapse and 0 for censored. Latency to relapse was defined as time to first gamble and was measured in weeks. As stated earlier, individuals with ceiling ratings of 105 on the GASS ($n = 5$) and individuals in treatment at the time of the self-efficacy rating ($n = 25$) were excluded from the analysis.

The survival analysis revealed that time to first gamble ($M = 7.98$ weeks, $SD = 11.34$, Range = 1 – 60, $Mdn = 4.14$) was significantly predicted by initial total GASS scores, $\chi^2(1) = 6.8$, $p = .009$ ($B = -.017$, $SE = .007$, Hazard Ratio = .98, 95% CI = .97 to .99), with higher levels of self-efficacy predicting better survival rates. The hazard ratio reveals that for each one-unit increase in total GASS score, the

probability of survival (i.e., not experiencing a relapse) increases by approximately 1.7%. Figure 2 displays the survival curve for this sample.

Hypothesis 2: Predicting Outcome Behaviour

The hypothesis that initial self-efficacy ratings predict the average days gambled and the average amount gambled per day over 3, 6, 12, and 60 months was examined using linear regressions. As recommended by Tabachnick and Fidell (2001), to reduce the impact of outliers, the three cases identified were recoded to a unit higher than the next highest score in the distribution. Average days gambled for 3, 6, 12, and 60 months were log transformed prior to analysis due to non-normal distributions (elevated skewness and kurtosis). A Bonferonni correction was employed to account for the series of regressions, $\alpha = .0125 (.05/4)$. Individuals with confidence ratings of 105 on the GASS and individuals in treatment were not included in the analysis.

Table 3 displays the regression analysis summaries for initial GASS scores predicting the log of average days gambled and the log of average amount gambled per day at 3, 6, 12, and 60 months. Initial GASS scores did not predict log of average days gambled at 3 months or 60 months, but was found to be approaching significance at 6 and 12 months. For amount gambled per day, similar results were found. Initial GASS scores failed to predict log of amount gambled per day at 3 and 60 months, but was approaching significance at 6 and 12 months.

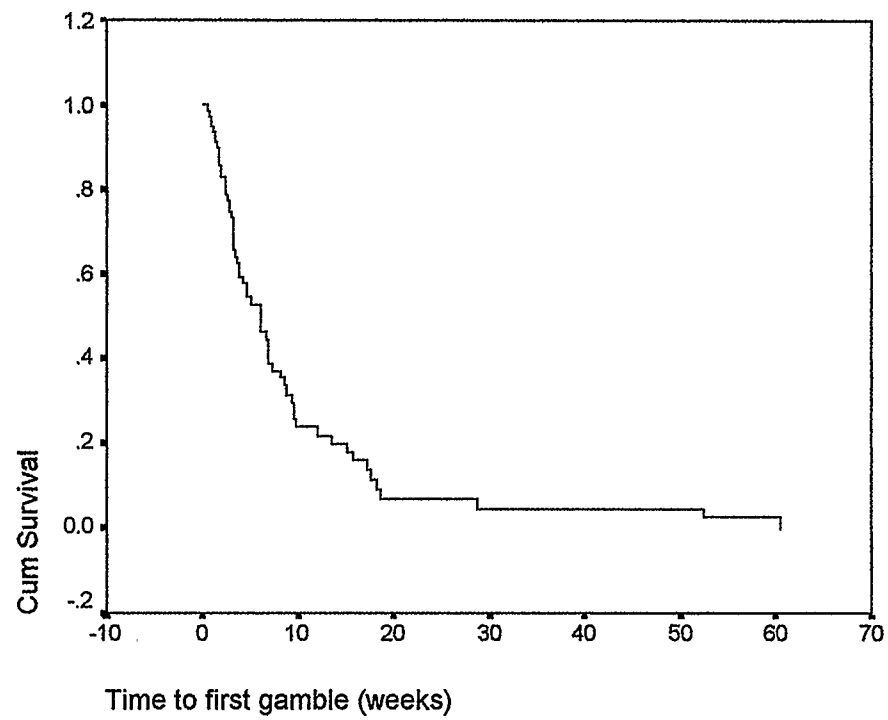


Figure 2. Survival curve displays the time to first gamble in weeks following a quit attempt.

Table 3

Regression Analysis Summary for Initial GASS Scores Predicting Log of Average Days Gambled and Log of Average Amount Gambled Per Day.

	Log of Average Days Gambled						
	<i>t</i>	R ²	B	SE	β	<i>p</i>	95% CI
3 months (n = 62)	-1.73	.047	-.010	.006	-.218	.089	-.022 to -.002
6 months (n = 59)	-2.27	.083	-.014	.006	-.288	.027	-.027 to -.002
12 month (n = 58)	-2.49	.100	-.015	.006	-.316	.016	-.028 to -.003
60 months (n = 34)	-.84	.022	-.014	.016	-.147	.407	-.047 to .020
	Log of Average Amount Gambled Per Day						
	<i>t</i>	R ²	B	SE	β	<i>p</i>	95% CI
3 months (n = 62)	-.925	.014	-.005	.006	-.119	.359	-.017 to -.006
6 months (n = 59)	-2.32	.086	-.038	.017	-.294	.024	-.072 to -.005
12 months (n = 58)	-2.42	.094	-.040	.017	-.307	.019	-.074 to -.007
60 months (n= 34)	.83	.021	.016	.020	.145	.412	-.024 to .057

Note. 3 and 6 month data are averaged over a 3 month period, 12 and 60 month data are averaged over a 6 month period.

Hypothesis 3: Mediation Role

Procedures outlined by Baron and Kenny (1986) were used to test the hypothesis that self-efficacy is a mediator of behaviour. To test mediation models it is recommended to use a series of regression equations, the first of which involves regressing the mediator on the predictor variable. This relationship is essential to establish because the predictor variable is thought to cause the mediator variable. The second step involves regressing the criterion variable on the predictor variable and the final step entails regressing the criterion variable on the predictor variable, as well as the mediator variable. A mediator effect is observed when the above relationships are verified significant and when the effect of the predictor variable on the criterion variable decreases after accounting for the mediator. Perfect mediation occurs when the effect of the predictor variable on the criterion variable becomes non-significant after controlling for the mediator.

Analysis of self-efficacy as a mediator requires a variable reflecting past performance and a variable reflecting future gambling behaviour. The variable that may best represent past performance is the degree of success an individual experiences following a quit attempt before a relapse (Vielva & Iraurgi, 2001). In this analysis, the number of days an individual remained abstinent following the quit attempt was the predictor variable, which was log transformed to achieve normality. The mediator variable, the next available rating of confidence, is the total GASS score at 3 months. Data for the average days gambled and the average amount gambled per day over the follow-up periods were logged due to non-normal distributions. The criterion variables are therefore the log of the average days

gambled and the log of the average amount gambled per day. The time periods of the criterion variables included in the analysis are 6 months, 12 months, and 60 months.

The first regression equation requires the predictor variable to significantly affect the mediator variable. A linear regression was used to regress the mediator variable (total GASS score at 3 months) on the log of days abstinent before relapse and was found to be significant, $t(47) = 2.09, p = .042$ ($B = 5.76, SE = 2.76, R^2 = .085, \beta = .291, 95\% CI = .205 \text{ to } 11.316$).

The second regression equation examined the relationship between the criterion variable and the predictor variable. Given the six linear regressions conducted, a Bonferroni correction required an alpha level equal to or less than .008 (.05/6). The log of days abstinent before relapse significantly predicted the log of days gambled at 6 months, $t(47) = -2.82, p = .007$ ($B = -.319, SE = .113, 95\% CI = -.548 \text{ to } -.091$) and the log of days gambled at 12 months, $t(47) = -4.16, p = .000$ ($B = -.442, SE = .106, 95\% CI = -.655 \text{ to } -.228$) but not at 60 months. Similar results were found when the log of the average amount gambled per day at 6 months, 12 months, or 60 months was regressed on the log of days abstinent before relapse. Table 4 displays the correlations and the total variance accounted for, for the above regressions.

The third regression equation included two steps, the first of which expects the mediator variable to predict the criterion variable. Using a hierarchical regression, the total GASS score at 3 months was entered on block 1 and the log of days abstinent before relapse was entered on block 2. Again using a Bonferroni correction of .008 for the six regressions, the total GASS scores at 3 months were able to

significantly predict the log of the average amount gambled per day at 12 months, $t(47) = -3.31, p = .002$ ($B = -.005, SE = .016, 95\% CI = -.083 \text{ to } -.020$), but failed to predict gambling behaviour at other time periods.

The second part of step 3 examines the ability of the predictor variable (log of days abstinent before relapse) to predict the criterion variable (days gambled, amount gambled) after controlling for mediator (self-efficacy). Table 4 displays the correlations in the mediation analysis and the amount of variance accounted for by past performance after controlling for self-efficacy. Examination of the table reveals the variance explained by the log of days abstinent before relapse substantially decreased when self-efficacy was controlled for. This relationship held in the expected direction for both dependent variables at all time periods, but was only significant for the log of average amount gambled per day at 12 months. This relationship is portrayed in Figure 3. Though not meeting the stringent Bonferroni correction in step 2, the ability of the log of days abstinent to predict the log of the amount gambled per day, decreased to non-significant levels after controlling for self-efficacy (variance accounted for decreased from 8.9% to 3.2% after controlling for self-efficacy). Since the above relationships held in the expected direction, self-efficacy can be said to mediate the relationship between past performance (the log of days abstinent) and long-term gambling behaviour (amount gambled per day at 12 months) in this sample.

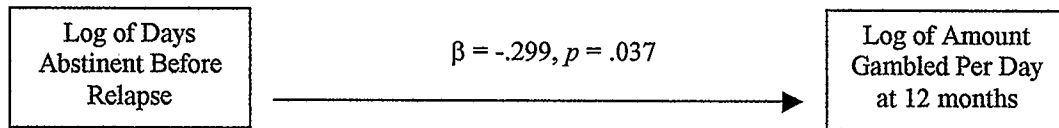
Table 4

Correlations in Mediation Analysis: Log of Days Abstinent and Total GASS at 3 Months With Log of Average Days Gambled and Log of Average Amount Gambled Per Day Over Follow-up Period.

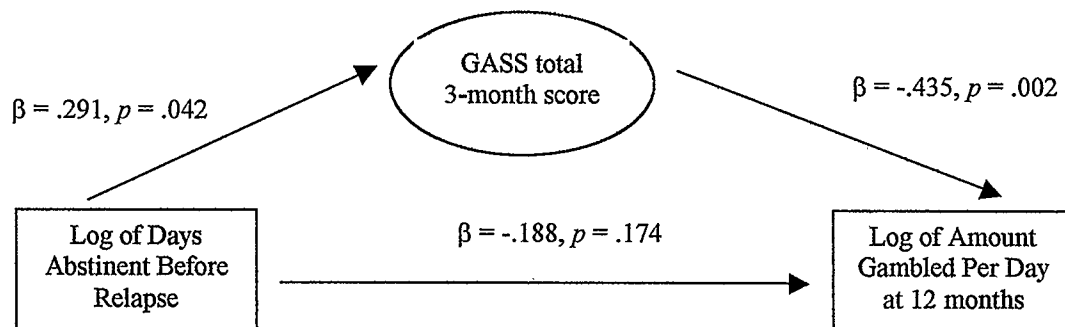
Predictor	Log of average days gambled					
	6 months (n = 49)		12 months (n = 49)		60 months (n = 29)	
	r	R ²	r	R ²	r	R ²
Total GASS score	-.208	.043	-.201	.040	-.312	.097
Log of days abstinent	-.380**	.145	-.519**	.269	-.358	.128
Log of days abstinent, controlling for self-efficacy	-.349*	.112	-.503**	.232	-.284	.071

Predictor	Log of average amount gambled per day					
	6 months (n = 49)		12 months (n = 49)		60 months (n = 29)	
	r	R ²	r	R ²	r	R ²
Total GASS score	-.284*	.081	-.435**	.189	-.342	.117
Log of days abstinent	-.183	.034	-.299*	.089	-.249	.062
Log of days abstinent, controlling for self-efficacy	-.110	.011	-.188	.032	-.149	.019

Note. * $p < .05$, ** $p < .01$



Step 1. Displays the zero-order correlation between the predictor (log of days abstinent before relapse) and the criterion variable (log of amount gambled per day at 12 months) before the mediator is accounted for.



Step 2. Displays the zero-order correlation between the predictor and the criterion variable, after controlling for the mediator (self-efficacy ratings on the GASS). The effect of the predictor on the criterion variable after accounting for the mediator decreases to a non-significant level.

Figure 3. Diagram Depicts Mediation Analysis With Correlations and *p* Values.

Hypothesis 4: Source Variables

The hypothesis that past performance and negative affect impact judgments of self-efficacy requires a measure of past performance and a measure of negative affect. The transformed variable of log of days abstinent before relapse was used as an indication of past performance and the total score on the Beck at 3 months, also log transformed to achieve normality, was used as an indication of negative affect. The criterion variable was the total score on the GASS at 3 months.

To get an indication of the relative contribution of each variable, a hierarchical regression was performed in which the log of days abstinent and the log of the Beck total score at 3 months were entered in block 1 and 2 respectively. Theory specifies that past performance should have a stronger impact on self-efficacy than negative affect and the hierarchical regression approach examines the variance accounted for by each variable. The regression analysis revealed that the full model accounted for 17.5% of the variance, $F(2, 50, N=53) = 6.4, p = .003$. The log of days abstinent before relapse predicted total GASS scores at 3 months, $t(51) = 2.21, p = .032$ ($B = 5.5, SE = 2.5, \beta = .28, 95\% CI = .51 \text{ to } 10.6$), accounting for 8.7% of the variance. The Beck total score at 3 months also predicted the total GASS score at 3 months, $t(51) = -2.6, p = .012$ ($B = -6.6, SE = 2.5, \beta = -.33, 95\% CI = -11.66 \text{ to } -1.52$), accounting for 11% of the variance.

Hypothesis 5: Self-efficacy is Independent from Outcome Expectancy

The hypothesis that self-efficacy is independent from outcome expectancy was examined through two means: 1) self-efficacy ratings were correlated with outcome expectancy ratings using an intraclass correlation coefficient and 2) the

predictive ability of outcome expectancy, above and beyond self-efficacy, was observed using regression analysis. Shrout and Fleiss (1979) describe several forms of the ICC and provide guidelines for choosing the appropriate model. The two-way mixed model provides an index of an individual's consistency in ratings over time and is the suitable approach to this analysis. Correlations lower than .40 are considered "poor", those between .40 and .59 are "fair", those between .60 and .74 are "good", and correlations higher than .75 are deemed "excellent" (Cicchetti, 1994). For this analysis, the correlations between scores are expected to be non-significant. High ratings may suggest that the constructs are not independent, therefore correlations of "poor" and "fair" may best indicate independence. The total confidence scores on the initial GASS were correlated with the total outcome expectancy scores on the initial TGS and yielded "fair" agreement, $ICC = -.52$ ($N=101$, $95\% CI = -.65$ to $-.36$).

To examine the predictive ability of outcome expectancy over and above self-efficacy, a hierarchical regression approach was used with initial GASS total scores and initial TGS total scores entered in the first and second blocks, respectively. The hierarchical approach allows for analysis of incremental variance as variables enter the model. The criterion variables tested, the log of the average days gambled for 3, 6, and 12 months and the log of the average amount gambled per day for 3, 6, and 12 months, resulted in an alpha level set at .008 (.05/6). As seen in Table 5, though initial GASS total scores seem to be approaching significance, TGS total scores offer nothing above and beyond self-efficacy scores.

Table 5
Regression Analysis Summary of Initial GASS Total Scores and Initial TGS Total Scores Regressed on the Log of Average Days Gambled and the Log of the Average Amount Gambled Per Day.

Log of Average Days Gambled								
	<i>t</i>	<i>p</i>	df	R ²	B	SE	β	95% CI
3 months (n = 62)								
SE	-1.73	.089	60	.047	-.001	.006	-.218	-.022 to .002
OE	-.088	.931	59	.000	-.001	.007	-.013	-.014 to .013
6 months (n = 59)								
SE	-2.27	.027	57	.083	-.014	.006	-.288	-.027 to .002
OE	-.445	.651	56	.003	-.003	.007	.064	-.017 to .011
12 months (n = 58)								
SE	-2.49	.016	56	.100	-.002	.006	-.316	-.028 to .003
OE	-.072	.943	55	.000	.001	.007	.010	-.017 to .013
Log of Average Amount Gambled Per Day								
	<i>t</i>	<i>p</i>	df	R ²	B	SE	β	95% CI
3 months (n = 62)								
SE	-.925	.359	60	.014	-.001	.006	-.119	-.017 to .006
OE	.875	.358	59	.013	-.000	.006	.127	-.007 to .018

6 months (n = 59)								
SE	-2.32	.024	57	.086	-.004	.017	-.294	-.027 to -.005
OE	.529	.599	56	.005	.001	.018	.075	-.026 to .045
12 months (n = 58)								
SE	-2.42	.019	56	.094	-.004	.017	-.307	-.074 to .007
OE	1.27	.209	55	.026	.002	.017	.176	-.013 to .057

Note. SE = self-efficacy measured by GASS; OE = outcome expectancy measured by TGS

Hypothesis 6: Situation Specificity

To examine the hypothesis that low self-efficacy ratings predict relapse situations, an intraclass correlation coefficient between initial confidence ratings on the GASS and subsequent relapse ratings on the RGS was calculated for each subscale. It is suggested that an intraclass correlation coefficient is the most powerful statistic for this type of inter-rater comparison and provides the most reliable analysis (Streiner, 1995; Shrout & Fleiss, 1979). Thus, ratings were calculated for clusters of situations (4 subscales) on both the GASS and RGS and compared for each time period.

ICC's between initial confidence ratings on the GASS and subsequent relapse ratings on the RGS are displayed in Table 6. Scores for each subscale of the GASS were correlated with each subscale of the RGS for 3, 6, and 12 months. As seen, there is no consistent pattern among the subscales.

Discussion

The present study attempted to establish the construct validity of self-efficacy with problem gamblers by examining the theorized relations of self-efficacy to problem gambling behaviour. Many of the hypotheses were supported in the theorized directions, including the predictive nature of self-efficacy. Self-efficacy judgments regarding the ability to resist gambling following a quit attempt predicted the time to first gamble. These judgments were approaching significance for predicting the average days gambled and the average amount gambled per day for 6 and 12 month follow-up but not 3 or 60 month follow-up. Further, 3 month self-

Table 6

Intraclass Correlation Coefficients Between GASS Scores and Subsequent Relapse Ratings on the RGS.

		RGS at 3 months (n = 56)			
	Subscale	1	2	3	4
GASS at initial	1	.45**	.08	.33	.18
	2	.59**	.42*	.12	.24
	3	.11	-.08	.19	.16
	4	.43*	.19	.33	.13
		RGS at 6 months (n = 47)			
	Subscale	1	2	3	4
GASS at 3 months	1	.70***	.24	.37	-.10
	2	.45*	.46*	.34	-.36
	3	.46*	-.24	.27	.07
	4	.42*	-.05	.42*	.28
		RGS at 12 months (n = 43)			
	Subscale	1	2	3	4
GASS at 6 months	1	.57**	.48*	.27	-.49
	2	.49**	.47*	.32	-.35
	3	.36	.23	.45*	-.38
	4	.39	.13	.46*	.23

Note. GASS = Gambling Abstinence Self-efficacy Scale; RGS = Reasons for Gambling Scale; Subscale 1 = winning/external situations, Subscale 2 = negative emotions, Subscale 3 = positive mood/testing/urges, and Subscale 4 = social factors; * $p < .05$, ** $p < .01$, *** $p < .001$

efficacy judgments mediated the relationship between past performance and long-term (12 month) gambling behaviour. Past performance and negative affect were proven sources of self-efficacy, but contrary to theory, negative affect accounted for more variance than past performance. As anticipated, outcome expectancy was found to be independent from self-efficacy and was not a predictor of future behaviour. Finally, situation specific self-efficacy judgments were not consistently correlated with the situations in which relapse occurred.

The significant finding that self-efficacy judgments predict time to relapse, as well as gambling behaviour helps establish the predictive validity of this construct. Consistent with the smoking and alcohol literature, self-efficacy ratings made by individuals not in treatment, were able to predict the amount of time a person remained abstinent before gambling. Individuals who made higher self-efficacy judgments to resist gambling maintained abstinence longer than individuals with lower self-efficacy judgments. Self-efficacy was able to predict the time to first gamble, whether the individuals who gambled experienced a slip or a relapse. Self-efficacy predicting time to first gamble is of great importance in treatment planning and relapse prevention. Gambling treatment programs would benefit from incorporating self-efficacy building strategies early in treatment thereby delaying relapse. Delaying relapse provides a longer period of abstinence (past performance), and should increase self-efficacy judgments. It would be of further benefit to examine the ability of self-efficacy to predict whether a gambling episode remains a slip or leads to a relapse.

Self-efficacy ratings made by individuals not attending treatment, were not able to predict 3 or 60 month gambling behaviour, but were approaching significance for 6 and 12 months. Both of the criterion measures, average days gambled and average amount gambled per day, revealed similar results when using the initial ratings on the GASS. The Bonferroni correction, used to account for the series of regressions to test this hypothesis, lowered the alpha level to a point where more power would be needed to detect significance. Nonetheless, the finding that both short-term (6 months) and long-term (12 months) gambling behaviour is predicted by self-efficacy ratings is consistent with findings from prior research in smoking cessation (Ockene et al., 2000).

That self-efficacy was not able to predict gambling behaviour at the 60 month follow up may, in part, be explained by the stage of change the individual was classified in. The Transtheoretical Model (Prochaska & DiClemente, 1983) considers self-efficacy to be an intervening variable important in effecting behaviour change. Consistent with the model and prior research (e.g. Herrick et al., 1997), self-efficacy in this sample was found to differ across the stages of change, with individuals in the action and maintenance stages reporting higher ratings of self-efficacy than individuals in the precontemplation and contemplation stages. Forty-three percent of the follow-up sample was classified in the precontemplation or contemplation stage indicating they were not currently trying to change their gambling behaviour.

Theoretically, the 3 month rating of self-efficacy should predict behaviour better than the initial ratings because of the recent evaluation of performance during the quit attempt. The regressions that examined the ability of the initial and 3 month

GASS ratings to predict future gambling behaviour revealed that only the 3 month GASS rating (used in the mediation analysis) was able to predict the log of the average amount gambled per day at 12 months. The finding that the 3 month GASS rating was able to predict gambling behaviour to the corrected alpha level when the initial GASS rating could not, provides compelling support for the self-efficacy theory and is consistent with prior literature (Baer et al., 1986).

Of note, is that the 3 month ratings of self-efficacy on the GASS predicted long-term gambling behaviour (12 months) for the average amount gambled per day and not the average days gambled. The two dependent measures, average days gambled and average amount gambled per day, can be said to reflect the frequency and the intensity of gambling behaviour. This study found that the 3 month self-efficacy rating was a better predictor of gambling intensity than gambling frequency at 12 months. Project Match Research Group (1998) found that self-efficacy predicted both drinking frequency and drinking intensity at 1 year follow-up, but that only drinking intensity was predicted at 3 year follow-up. The intensity of gambling (i.e., the amount gambled per day) may provide a better indication of the severity of gambling behaviour, at least in the long term, than the frequency of gambling behaviour (i.e., the number of days gambled).

Bandura (1969, 1997) proposed that both past performance and negative affect are sources of self-efficacy, with past performance exerting more influence on self-efficacy ratings than negative affect. That the two source variables together accounted for almost 18% of the variance in self-efficacy judgments at 3 months provides fairly strong support for the self-efficacy theory. However, the present study

found that negative affect, as measured by the BDI, accounted for more of the variance in self-efficacy judgments than past performance, as measured by the number of days an individual was able to remain abstinent.

The unexpected finding that negative affect accounted for more variance in self-efficacy ratings than past performance warrants examination. A likely explanation for these results is that the predictor variable “days abstinent following a quit attempt” is not as sensitive a measure of past performance as the BDI is a measure of negative affect. This study measured an individual’s success following an initial quit attempt. It is possible that many individuals’ made several quit attempts in the 3 months prior to the self-efficacy rating and thus used additional information in making self-efficacy judgments. An individual’s second or third quit attempt may have proven more successful and thus provided different information regarding past performance than the initial quit attempt.

Self-efficacy Theory specifies that self-efficacy is independent from outcome expectancy, which was supported through two analyses. The inter-rater agreement between the GASS and TGS was the first analysis that supported the hypothesis that self-efficacy is independent from outcome expectancy. The correlation of $-.52$ is considered to be “fair” agreement (Cicchetti, 1994) and indicates the absence of both multicollinearity (the variables are not too highly correlated) and singularity (the variables are not redundant). This moderate negative correlation between self-efficacy and outcome expectancy is similar to prior research findings in smoking cessation (Zentner & Borland, 1995). Participants in this study, and in Zentner and Borland’s study, had all made a recent quit attempt and therefore, were in the action stage of

change. In contrast, the one research study that found a high correlation between self-efficacy ratings and temptation ratings was comprised of a more divergent sample, spanning across the stages of change (Velicer & DiClemente, 1990).

The predictive ability of each construct provided additional evidence to support the hypothesis that outcome expectancy is independent from self-efficacy. The correlations revealed that self-efficacy and outcome expectancy did not influence future behaviour to the same extent. In fact, only self-efficacy judgments were found to predict gambling behaviour. The fact that outcome expectancy did not predict gambling behaviour while self-efficacy did supports the theory that self-efficacy is a stronger influence on behaviour than outcome expectancy. Outcome expectancy ratings on the TGS were not expected to predict gambling behaviour. According to Bandura (1984), expected outcomes may not add much to the prediction of behaviour because expected outcomes are highly dependent on self-efficacy judgments. Consistent with theory, the outcome expectancy ratings did not predict either the average days gambled or average amount gambled per day at 3, 6, or 12 months.

The validity of the above conclusion that self-efficacy is independent from outcome expectancy depends on how accurate the measurement of temptations to gamble reflects outcome expectancy. Many researchers have conceptualized outcome expectancy as temptations (e.g., Stephens et al., 1995) as they are closely related constructs. The degree that an individual is tempted to perform an action depends on the belief that the action will lead to an outcome. Therefore it is said that temptation reflects positive expectations. Future research should examine the relationship

between outcome expectancy and temptations in order to clarify the validity of using a questionnaire of temptations to measure outcome expectancy.

A major hypothesis that failed to find support is that ratings of self-efficacy can predict the situations of subsequent relapse. The subscales of the GASS did not correlate consistently with the subscales of the RGS. One would have expected, for example, that subscale 1 of the GASS would significantly correlate with subscale 1 of the RGS and yield low correlations with the other subscales of the RGS. This would indicate that individuals who rated self-efficacy as low in that cluster of situations also rated that cluster of situations as being important reasons for subsequent gambling. Since the subscales were not correlated as expected, the data suggests that self-efficacy judgments for abstaining from gambling are not situation specific, but rather capture a global rating of confidence to abstain from gambling.

A more likely explanation for the failure of self-efficacy to predict relapse situations is that the measurement of situation specificity was not sensitive enough. Correlations between the subscales on the GASS and subscales on the RGS were not sufficient to detect the ability of self-efficacy judgments to predict relapse situations. Individuals rated their confidence in all 21 situations covered by the GASS at the initial interview and at 3 months, they rated their reasons for *one* specific gambling occasion on the RGS. An individual may have rated any number of situations on the GASS where their confidence was low, but endorsed only a few reasons for relapse on the RGS thereby making agreement difficult to detect by correlation analysis. Prior research has taken a number of different approaches to examining the situation specific nature of self-efficacy, without consistent results. Future research should

employ more sensitive measures to detect the ability of self-efficacy to predict relapse situations.

Another factor that may account for the failure of self-efficacy ratings to predict relapse situations is that the first relapse incident following the self-efficacy ratings was not examined. Instead, the last relapse episode before the follow-up interview was targeted. The RGS was completed for the last relapse episode experienced by the gambler in order to minimize memory problems. Self-efficacy however is hypothesized to predict the situation in which the individual first slips following a quit attempt (Bandura, 1984). It is likely that self-efficacy ratings would have changed for relapse episodes following the first slip.

The present study has a number of notable limitations. First, the measures used in the original study and the follow-up study all relied on self-report which can lead to less reliable information due to personal biases or demand characteristics. However, in the initial study, 66% of participants were able to provide a collateral that corroborated their recent gambling involvement, with overall kappa agreement between gamblers reports and collateral reports rated as “fair” to “good” (Hodgins & Makarchuk, 2003). The reliability of self-reports was supported using a multi-method approach (i.e., structured interviews, semi structured interviews, and questionnaires) and test-retest data. Results over a two to three week period yielded good agreement between gambler’s reports using both interviews and questionnaires.

A second limitation was that much of the outcome information collected involves retrospective recall of past gambling behaviour, which may have led to unreliable information. Two recent studies provide support for the use of the TLFB

method in aiding recall of gambling behaviour. This method has been validated in problem gamblers for periods from 3 months to 1 year. Thus, the current study did not use information recalled from over a 1 year period. The concern that gamblers significantly under- or over-estimate their gambling activities or expenditures was not supported (Hodgins & Makarchuk, 2003; Weinstock et al., 2004). Retrospective recall of other information (e.g., reasons for relapsing) remains to be validated.

Much debate exists over the best method to collect and represent gambling behaviour. Outcome information for gambling in this study has been represented by three methods that have been used in previous gambling research: the continuous variable of number of days abstinent; the continuous variable of number of days gambled; and a continuous variable of amount gambled per day. Each of these variables revealed a skewed distribution and were log transformed to achieve normality. The results of this study seem to support the use of the average amount gambled per day as a more sensitive measure of gambling severity than average days gambled.

A final measurement concern lies with the instrument used to evaluate self-efficacy, the GASS. This scale is relatively new and in need of further validation. However, initial studies do provide promising support for the reliability and validity of the GASS (Hodgins, Peden, et al., in press).

Also limiting the results of the study is the diversity of gamblers represented in this study. Problem gamblers who were seeking treatment throughout the initial study varied in the type and frequency of treatment they sought (e.g., weekly GA meeting, seeing a counselor twice a year). As well, the type of gambling varied

among participants, with most of the sample experiencing problems with video lottery terminals. Individuals experiencing problems with other major forms of gambling are underrepresented in this sample. Future research should aim to represent more diverse types of gambling activities.

Thus, the generalizability of findings is restricted to community samples of problem gamblers who are mostly Caucasian Canadian VLT players. The attrition rates for this study also warrant caution when generalizations to the population are made. However, the analyses of those who completed follow-up and those who did not complete follow-up at 12 and 60 months revealed few differences in demographic variables or gambling involvement. The results of this study should be replicated with more diverse ethnic groups and with other forms of gambling to establish whether self-efficacy demonstrates similar importance in the quitting process.

Another concern of this study is the criteria used to exclude individuals from analysis. Individuals with ceiling ratings on the GASS were excluded from all predictive analysis. Past researchers (e.g. Burling et al., 1989; Rychtarik et al., 1991; McMahon & Jones, 1992; Stephens et al., 93;) have suggested that ceiling ratings of self-efficacy reflect an over estimation of one's abilities to succeed or an underestimation of the difficulty of the task. Including such unrealistic ratings in predictive analysis can mask self-efficacy's prognostic ability.

In addition, individuals currently receiving treatment at the time of the self-efficacy rating were also excluded from predictive analysis. In an earlier study involving this sample, treatment was found to be a moderator of self-efficacy. In other words self-efficacy was found to predict gambling behaviour only for those

individuals not receiving treatment (Hodgins, Peden, et al., in press). It is suspected that treatment is a dynamic process that modifies self-efficacy expectations.

Despite these limitations, the results of this study supports several hypothesized relations of self-efficacy to problem gambling and are of considerable importance. This project has established support for the theory of self-efficacy in relation to problem gambling thereby expanding the construct validity of self-efficacy to yet another addictive behaviour using a clinical sample. A major implication of this study is that treatment models for problem gambling should consider incorporating the Self-efficacy Theory, thereby strengthening their foundation and providing more effective treatment. The results of this study also provide initial support for the broader Social Cognitive Theory. Given the success of self-efficacy theories in this sample of problem gamblers, future studies might consider examining other major tenets of the Social Cognitive Theory.

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Appendix A
GAMBLING ABSTINENCE SELF-EFFICACY SCALE

The following 24 questions are a list of reasons why people begin to gamble again after they have given up gambling. Please rate these on how confident you are that you *will not* gamble in that situation. Zero means not at all confident and five means you would be extremely confident.

Circle only one number for each item.

Situation	Not at all Confident		Moderately Confident		Extremely Confident	
1) Feeling angry or frustrated, either with myself or because things were not going my way.	0	1	2	3	4	5
2) Feeling bored.	0	1	2	3	4	5
3) Feeling anxious or tense.	0	1	2	3	4	5
4) When I have the opportunity to gamble I just have to give in.	0	1	2	3	4	5
5) Feeling sad.	0	1	2	3	4	5
6) Feeling physically uncomfortable because I want to gamble.	0	1	2	3	4	5
7) Being in a good mood.	0	1	2	3	4	5
8) Wanting to see what would happen if I gambled just a little.	0	1	2	3	4	5
9) Feeling tempted to gamble out of the blue.	0	1	2	3	4	5
10) Someone invited me to gamble.	0	1	2	3	4	5

Reasons for beginning to gamble	Not at all Confident		Moderately Confident		Extremely Confident	
11) Feeling angry or frustrated because of my relationship with someone else.	0	1	2	3	4	5
12) Being with others having a good time and we felt like gambling together.	0	1	2	3	4	5
13) Feeling worried or tense because of my relationship with someone else.	0	1	2	3	4	5
14) Feeling physically ill or in pain.	0	1	2	3	4	5
15) Feeling others were being critical of me.	0	1	2	3	4	5
16) Seeing others gambling.	0	1	2	3	4	5
17) Wanting to win.	0	1	2	3	4	5
18) Needing to win back past losses.	0	1	2	3	4	5
19) An opportunity to gambled happened out of the blue.	0	1	2	3	4	5
20) Feeling lucky.	0	1	2	3	4	5
21) Feeling pressured by financial debts.	0	1	2	3	4	5
22) When I am in a situation in which I am in the habit of gambling.	0	1	2	3	4	5
23) When I wanted to escape from my thoughts and feelings.	0	1	2	3	4	5
24) When I didn't care anymore.	0	1	2	3	4	5

Appendix B
SOUTH OAKS GAMBLING SCREEN

1. In the past year, when you participate in the gambling activities we have discussed, how often do you go back another day to win back money you lost?

Never
Sometimes (less than half the time)
Most of the time
Every time

2. In the past year have you claimed to be winning money from your gambling activities when in fact you lost?

No Yes

3. In the past year did you spend more time or money gambling than you intended?

No Yes

4. In the past year have people criticized your gambling?

No Yes

5. In the past year have you felt guilty about the way you gamble or about what happens when you gamble?

No Yes

6. In the past year have you felt that you would like to stop gambling, but didn't think you could?

No Yes

7. In the past year have you hidden betting slips, lottery tickets, gambling money or other signs of gambling from your spouse or partner, children, or other important people in your life?

No Yes

8. In the past year, have you argued with people you live with over how you handle money? (*If "No", go to Question 9*)

Have these arguments ever centered on your gambling?

No Yes

9. In the past year have you missed time from work or school due to gambling?

No Yes

10. In the past year, have you borrowed from someone and not paid them back as a result of your gambling?

No Yes

11. In the past year, have you borrowed from household money to finance gambling?

No Yes

12. In the past year, have you ever borrowed money from your spouse or partner to finance gambling?

No Yes

13. In the past year, have you borrowed from other relatives or in-laws to finance gambling?

No Yes

14. In the past year, have you received loans from banks, loan companies, or credit unions for gambling or to pay gambling debts?

No Yes

15. In the past year, have you made cash withdrawals on credit cards such as VISA or MasterCard to get money to gamble or to pay gambling debts? (not including ATM cards).

No Yes

16. In the past year, have you received loans from loan sharks to gamble or to pay gambling debts?

No Yes

17. In the past year, have you ever cashed in stocks, bonds, or other securities to finance gambling?

No Yes

18. In the past year, have you sold personal or family property to gamble or pay gambling debts?

No Yes

19. In the past year have you borrowed money from your chequing account by writing cheques that get bounced to get money for gambling or to pay gambling debts?

No Yes

20. In the past year have you felt that you had a problem with betting money or gambling?

No Yes

Appendix C

TEMPTATIONS FOR GAMBLING QUESTIONNAIRE

The following 24 questions are a list of reasons why people begin to gamble again after they have given up gambling. Please rate these on how tempted you are to gamble in that situation. Zero means not at all tempted and five means you would be extremely tempted.

Circle only one number for each item.

Situation	Not at all Tempted		Moderately Tempted		Extremely Tempted	
1) Feeling angry or frustrated, either with myself or because things were not going my way.	0	1	2	3	4	5
2) Feeling bored.	0	1	2	3	4	5
3) Feeling anxious or tense.	0	1	2	3	4	5
4) When I have the opportunity to gamble I just have to give in.	0	1	2	3	4	5
5) Feeling sad.	0	1	2	3	4	5
6) Feeling physically uncomfortable because I want to gamble.	0	1	2	3	4	5
7) Being in a good mood.	0	1	2	3	4	5
8) Wanting to see what would happen if I gambled just a little.	0	1	2	3	4	5
9) Feeling tempted to gamble out of the blue.	0	1	2	3	4	5
10) Someone invited me to gamble.	0	1	2	3	4	5

Reasons for beginning to gamble	Not at all Tempted		Moderately Tempted		Extremely Tempted	
11) Feeling angry or frustrated because of my relationship with someone else.	0	1	2	3	4	5
12) Being with others having a good time and we felt like gambling together.	0	1	2	3	4	5
13) Feeling worried or tense because of my relationship with someone else.	0	1	2	3	4	5
14) Feeling physically ill or in pain.	0	1	2	3	4	5
15) Feeling others were being critical of me.	0	1	2	3	4	5
16) Seeing others gambling.	0	1	2	3	4	5
17) Wanting to win.	0	1	2	3	4	5
18) Needing to win back past losses.	0	1	2	3	4	5
19) An opportunity to gambled happened out of the blue.	0	1	2	3	4	5
20) Feeling lucky.	0	1	2	3	4	5
21) Feeling pressured by financial debts.	0	1	2	3	4	5
22) When I am in a situation in which I am in the habit of gambling.	0	1	2	3	4	5
23) When I wanted to escape from my thoughts and feelings.	0	1	2	3	4	5
24) When I didn't care anymore.	0	1	2	3	4	5

Appendix D

REASONS FOR GAMBLING SCALE

The following 24 questions are a list of reasons why people begin to gamble again after they have given up gambling. Please rate these on how important each reason was for you when you began to gamble. Rate each reason on the scale provided. Zero means the reason was not important at all for you, and five means that the reason was very important to you.

Circle only one number for each item.

Reasons for beginning to gamble	Not at all Important		Moderately Important		Extremely Important	
1) I felt angry or frustrated, either with myself or because things were not going my way.	0	1	2	3	4	5
2) I felt bored.	0	1	2	3	4	5
3) I felt anxious or tense.	0	1	2	3	4	5
4) When I had the opportunity to gamble I just had to give in.	0	1	2	3	4	5
5) I felt sad.	0	1	2	3	4	5
6) I felt physically uncomfortable because I wanted to gamble.	0	1	2	3	4	5
7) I was in a good mood.	0	1	2	3	4	5
8) I wanted to see what would happen if I gambled just a little.	0	1	2	3	4	5
9) I just felt tempted to gamble out of the blue.	0	1	2	3	4	5
10) Someone invited me to gamble.	0	1	2	3	4	5

Reasons for beginning to gamble	Not at all Important		Moderately Important		Extremely Important	
11) I felt angry or frustrated because of my relationship with someone else.	0	1	2	3	4	5
12) I was with others having a good time and we felt like gambling together.	0	1	2	3	4	5
13) I felt worried or tense because of my relationship with someone else.	0	1	2	3	4	5
14) I felt physically ill or in pain.	0	1	2	3	4	5
15) I felt others were being critical of me.	0	1	2	3	4	5
16) I saw others gambling.	0	1	2	3	4	5
17) I wanted to win.	0	1	2	3	4	5
18) I needed to win back past losses.	0	1	2	3	4	5
19) An opportunity to gamble happened out of the blue.	0	1	2	3	4	5
20) I felt lucky.	0	1	2	3	4	5
21) I felt pressured by financial debts.	0	1	2	3	4	5
22) I am in a situation in which I am in the habit of gambling.	0	1	2	3	4	5
23) I wanted to escape from my thoughts or feelings.	0	1	2	3	4	5
24) I didn't care anymore.	0	1	2	3	4	5

Appendix E

GAMBLING READINESS TO CHANGE SCALE

Instructions: The following questionnaire is designed to identify how you personally feel about your gambling right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please mark the answer of your choice to each question according to the following scale.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree

- _____ 1. I enjoy my gambling, but sometimes I gamble too much.
- _____ 2. Sometimes I think I should cut down on my gambling.
- _____ 3. It's a waste of time thinking about my gambling.
- _____ 4. I have just recently changed my gambling habits.
- _____ 5. Anyone can talk about wanting to do something about gambling, but I am
actually doing something about it.
- _____ 6. My gambling is a problem sometimes.
- _____ 7. There is no need for me to think about changing my gambling.
- _____ 8. I am actually changing my gambling habits right now.
- _____ 9. Gambling less would be pointless for me.

Scoring:

Precontemplation	= 9 + 7 + 3
Contemplation	= 1 + 2 + 6
Action	= 8 + 5 + 4

Appendix F



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CERTIFICATION OF INSTITUTIONAL ETHICS REVIEW

This is to certify that the Conjoint Faculties Research Ethics Board at the University of Calgary has examined the following research proposal and found the proposed research involving human subjects to be in accordance with University of Calgary Guidelines and the Tri-Council Policy Statement on *"Ethical Conduct in Research Using Human Subjects"*. This form and accompanying letter constitute the Certification of Institutional Ethics Review.

File no: **CE101-3647**
 Applicant(s): **Nicole Elizabeth Peden**
 Department: **Psychology**
 Project Title: **Influence of Substance Dependence and Mood Disorders on Outcome from Pathological Gambling**
 Sponsor (if applicable):

Restrictions:

This Certification is subject to the following conditions:

1. Approval is granted only for the project and purposes described in the application.
2. Any modifications to the authorized protocol must be submitted to the Chair, Conjoint Faculties Research Ethics Board for approval.
3. A progress report must be submitted 12 months from the date of this Certification, and should provide the expected completion date for the project.
4. Written notification must be sent to the Board when the project is complete or terminated.


 Janice Dickin, Ph.D, LLB,
 Chair
 Conjoint Faculties Research Ethics Board

August 25, 2003

Date:

Distribution: (1) Applicant, (2) Supervisor (if applicable), (3) Chair, Department/Faculty Research Ethics Committee, (4) Sponsor, (5) Conjoint Faculties Research Ethics Board (6) Research Services.

Note: This thesis is a substudy of the above titled project.