International Gambling Studies

ISSN: 1445-9795 (Print) 1479-4276 (Online) Journal homepage: www.tandfonline.com/journals/rigs20

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Tony Schellinck & Tracy Schrans

To cite this article: Tony Schellinck & Tracy Schrans (2004) Gaining control: trends in the processes of change for video lottery terminal gamblers, International Gambling Studies, 4:2, 161-174, DOI: 10.1080/14459790412331296983

To link to this article: https://doi.org/10.1080/14459790412331296983

Published online: 12 Dec 2010.

International Gambling Studies, Vol. 4, No. 2, November 2004

Gaining Control: Trends in the Processes of Change for Video Lottery Terminal Gamblers

TONY SCHELLINCK & TRACY SCHRANS

School of Business Administration, Dalhousie University, Canada, Focal Research Consultants Ltd, Canada

ABSTRACT *This study examined the processes of change used by problem gamblers in the action and maintenance stages of the Transtheoretical Model of Change (TTM) as proposed in the research by Prochaska and DiClemente. A sample of 25 problem gamblers in the action stage and 38 in the maintenance stage were compared in terms of usage of three of these processes (counterconditioning, stimulus control and reinforcement management). Two mediating variables, self-efficacy and situational temptation, were also assessed. As hypothesised, the usage of counter-conditioning and stimulus control declined significantly between the action and maintenance stages. No change was found in reinforcement management between the stages. Self-efficacy increased and situational temptation declined between the action and maintenance stages. Problem gamblers made significant use of these processes suggesting the TTM model is applicable to problem gambling. The discussion focuses on possible regulatory and venue operator actions that might help the problem gambler utilise these processes in the natural recovery process.*

Introduction

Problem gambling has become a major community health issue in many countries. For example, prevalence surveys have found problem gambling rates to range from 0.92% to 2.01% of adults in the US and Canada (Shaffer and Korn, 2002) and to be an estimated 2.07% in Australia (Productivity Commission, 1999). The rapid increase in problem gambling in these countries has been attributed to the introduction of electronic gambling machines (EGMs), or video lottery terminals (VLTs) as they are referred to in Canada. These machines have been placed in communities where they are easily accessible to the general population in several of the provinces.

Most researchers who have examined ways of assisting these problem gamblers have assumed that the most effective method of providing assist is to refer these individuals to specialised clinics or some other form of formal therapy. Whether problem gambling is overcome with the aid of formal treatment or through natural recovery, individuals usually utilise some form of coping strategies (Sharpe, 2002). Coping strategies are the behaviours and thought patterns that people use to control the amount they gamble and can include the development of budgets, avoiding locations that provide gambling, rewarding oneself for not gambling, and seeking help from others to gain control of their gambling. Several studies have examined the factors leading to recovery of problem gamblers in the treatment population (Echeburúa *et al.*, 1996; Milton *et*

ISSN 1445-9795 print/1479-4276 online/04/020161-14 © 2004 Taylor & Francis Ltd
DOI: 10.1080/14459790412331296983

al., 2002; Walker, 1993), and other studies have examined coping strategies among both regular and problem gamblers (Shepherd and Dickerson, 2001). However, few studies have examined coping mechanisms among those problem gamblers who have achieved natural recovery (Hänninen and Koski-Jännes, 1999; Hodgins, 2001; Hodgins and El-Guebaly, 2000).

In this paper we examine a randomly obtained sample of problem gamblers who are in the process of overcoming problems with video lottery (VL) to determine their self reliance on certain processes in achieving their goals. The discussion does not focus on the treatment implications of the research findings, as very few of these individuals access professional problem gambling assistance or other traditional community health services for assistance. Instead, discussion focuses on opportunities to proactively facilitate self-help efforts through EGM venue operator policies, regulatory controls and community health initiatives that are designed to assist in the natural recovery process.

Research into other forms of addiction has shown natural recovery is common for both alcoholism (Sobell *et al.*, 1996) and smoking (DiClemente and Prochaska, 1982). DiClemente and Prochaska (1998) point out that for most addictive populations, only approximately 25% of those exhibiting problem behaviours as defined by the DSM-IV enter professional therapy programs. Similar results were found for problem gambling (Schrans *et al.*, 2002) where only 16% of problem VLT gamblers (both those who had ceased gambling and those who continue to gamble) had ever contacted or used formal services for help in overcoming their problem gambling. Of those who claimed to have resolved a VL gambling problem, 75% had never contacted any formal problem gambling services or health professionals for assistance. Therefore, to understand how a large percentage of problem gamblers resolve their gambling problems, the analysis must include those outside of treatment populations.

The Transtheoretical Model of Change (TTM) proposed by Prochaska and DiClemente (1992) has potential application in the area of problem gambling as it identifies distinctive stages associated with achieving successful changes in addictive behaviours, such as gambling, as well as the various processes that problem gamblers may use to progress through such stages of change. These processes, it can be argued, are coping strategies used by problem gamblers to achieve their goals of abstinence or controlled play. The TTM is based on both treatment-facilitated and self-mediated modification of problem behaviours (Prochaska *et al.*, 1992) and is suitable for use in surveys involving both individuals who have and have not experienced formal treatment. The TTM has three major components: stages of change, processes of change and levels of change (Prochaska and DiClemente, 1992). The five stages of change are as follows: precontemplation when the person has no intention of changing their behaviour in the foreseeable future; contemplation where people are aware they have a problem but have not yet made a commitment to change their behaviour; preparation when the person has decided to change their behaviour, usually within the next month, and has already made small behaviour changes; action when the person has modified their behaviour, experiences or environment in order to overcome their problem; and maintenance when the person works to avoid relapse and consolidates their gains achieved during the action stage.

Processes of change are employed by the gambler at particular stages and are responsible for moving the individual through the stages. They are often employed and effective at different stages. In general, there are two classes for

each of the ten processes that are categorised as either experiential or behavioural. Behavioural processes usually are used in the last three stages of change. The ten processes of change are: consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, social liberation, self-liberation, helping relationships, reinforcement management, counter-conditioning and stimulus control.

Only the last three processes were included in the current study. Reinforcement management involves rewarding oneself or having others reward you for making the desired changes. Counter-conditioning occurs when the gambler substitutes alternatives for the problem behaviours and includes relaxation, desensitisation, assertion and positive self-statements. Stimulus control requires the individual to avoid or counter stimuli that elicit problem behaviours and involves restructuring the environment, avoiding high-risk cues and fading techniques.

The third major component of the TTM model which was not examined in this study incorporates into the model the realisation that individuals are likely to be at different stages of change with respect to different problem behaviours at any given time. There are five levels of change: symptom/situational, maladaptive cognitions, interpersonal problems, system/family problems and intrapersonal.

In addition to the three processes of change from the TTM model, two other components, self-efficacy and situational temptations, have been introduced as intermediate outcome variables in the model. Both are based on the original work of Bandura (1977, 1982). The self-efficacy measure is determined by asking respondents how *'confident'* they are that they would not engage in problem behaviours if they found themselves in a range of problem situations. Situational temptation is measured similarly by asking the respondents how *'tempted'* they would be by the same range of problem situations to engage in problem behaviour. The situational temptation measure is seen as unidimensional and has been shown to linearly decrease from the precontemplation to maintenance stages of change in the TTM (DiClemente *et al.*, 1991; Prochaska *et al.*, 1991). Self-efficacy has been shown to increase over the TTM stages (Velicer *et al.*, 1990), peaking after 18 months of continuous abstinence. The scale of self-efficacy measure may be used as a single general scale or as separate scales (primary efficacy dimensions). The number of primary efficacy dimensions that may emerge is expected to be different for each problem area and is determined by the nature of that problem area (Clark *et al.*, 1991). Researchers in each problem area have applied principal components analysis to the set of items to determine the number of efficacy dimensions appropriate for use in that area. To date there have been no published studies examining the potential for primary efficacy dimensions in the area of problem gambling.

Although the TTM has been applied to a variety of addiction behaviours, we are aware of only one published study applying the model to problem gamblers. Hodgins (2001) studied 37 recovered problem gamblers and found that the most frequently used processes were self evaluation, environmental re-evaluation, dramatic relief, and self liberations with the least used processes being reinforcement management and social liberations. Those who were 'self changers' were less likely to use any of the processes of change. The results showed that the constructs (as amended by Hodgins, 2001) had reasonable internal consistency estimates of reliability, ranging from 0.64 up to 0.86. The mean usage rating per item was in the 2.4 to 3.8 range (out of 5) indicating that problem gamblers used

these processes at least occasionally and sometimes frequently to help change their gambling behaviour. Therefore, further research, examining the use and value of these processes in helping gamblers overcome their problem behaviour, is warranted.

To identify the potential value and structure of the TTM model in relation to problem gambling, several elements of the model were incorporated into a longitudinal study with video lottery gamblers being conducted for the Nova Scotia Department of Health, Addictions Services. A sub-sample of problem VL gamblers and lapsed regular VL gamblers identified in 1998 was recontacted two years later to examine problem gambling development and the resolution process. The Resolved Players sample was expected to be comprised primarily of VLT gamblers in the action and maintenance stages of change. Four of the processes of change; helping relationships, reinforcement management, counter-conditioning and stimulus control, are emphasised during the action-maintenance stages of change (Prochaska *et al.*, 1992). Due to space limitations we have only included the latter three processes as we felt such measures would be most useful for our analysis. The self-efficacy and situational temptations measures were also administered.

Hypotheses

We hypothesised that the use of the three processes of change would decline between the action and maintenance stages, in keeping with trends found previously for other addicted populations (Prochaska *et al.*, 1992). The situational temptation measure should decrease from action to maintenance (DiClemente *et al.*, 1991; Prochaska *et al.*, 1991). Self-efficacy should increase between the action and maintenance stages (Velicer *et al.*, 1990). The use of processes of change in the stages should be greatest for counterconditioning, followed by stimulus control and reinforcement management (Hodgins, 2001).

Methods

Participants

In phase one of the study a survey conducted between October 1997 and January 1998 screened 18,659 adults in the province of Nova Scotia, Canada for eligibility to join a panel of current and former regular VLT gamblers (gambled on VLTs once a month or more). Of a total of 927 eligible current and former regular VLT gamblers, 674 (73%) joined the panel. Of these, 482 were active regular VL gamblers and 192 were former regular VL gamblers.

Phase two of the study was conducted from February to April 2000 (Schellinck *et al.*, 2002). We returned to the panel in order to draw a quota sample of gamblers who fell into five categories: past problem gamblers who had stopped gambling, past problem gamblers who had overcome their problem but continued to gamble at some level, problem gamblers who had yet to overcome their problem, past regular gamblers and present gamblers who were not categorised as problem gamblers. A total 218 panel members fell into these categories and were selected for inclusion in the survey. Of these, 181 responded to a survey dealing with their coping strategies (response rate = 74%). The 17 questions covering the three processes of change, and the 27 questions for each of

self-efficacy and situational temptations were only administered to those 98 respondents (out of the 181) who self identified as problem VL gamblers in the past, and indicated that they had stopped or reduced VL gambling in order to control their problem behaviour. Of these, 25 were found to be in the action stage and 38 in the maintenance stage.

Identification of Problem Gamblers

Remission from problem gambling was measured by two questions. The first asked self-identified problem VL gamblers whether they had solved their problem with VL playing or whether it was still a concern. Possible responses included completely resolved, partially resolved, and unresolved. Respondents noting any degree of problem resolution were then asked to indicate how long ago (i.e., when) they had initiated or achieved problem resolution. Of the 98 participating players identified as Problem VL Gamblers in the original 1998 study, 24 (24%) had discontinued VL play at the time of the follow-up survey two years later (2000), while 28 (29%) had resolved their problem and continued to play VL, and 46 (47%) had remained playing at problematic levels.

All respondents were also administered the DSM IV. Subsequent to data analysis the robustness of self-declaration was evaluated by comparing the results found using the DSM IV (American Psychiatric Association, 1994). Among the 181 persons in the total sample, 54% reported that, at some time, they had a problem with spending too much time and/or money playing VLTs. Based on the DSM IV criteria, there is an 80% level of concurrence with players' self-reports (kappa = .61), suggesting that there is substantial agreement between the player's own identification of his or her play as problematic and the DSM IV assessment of problem play.

Identification of TTM Stages of Change

There are two general approaches to identifying what stage of change a person is in. The first is based on a person's response to a multi-item scale for each stage with the person assigned to the stage based on which scale they score highest. This approach has been found to be useful for individuals entering a clinic for treatment because of their propensity to feign readiness to change. However, if there is no strong pressure to simulate readiness, as would be expected in an anonymous telephone interview, then a single item, continuous measure of specific attitudes and intentions, has been found to be appropriate for classifying individuals according to stages of change (Carney and Kivlaham, 1995; DiClemente and Hughes, 1999).

An individual's stage of change was determined by asking respondents what their current situation was with VL gambling; had they solved their VL problem more than six months ago (maintenance), had they taken action on their VL problem within the last six months (action), did they intend to take action on their VL problem in the next month (preparation), and were they intending on taking action on their VL problem in the next six months (contemplation). If they answered no to all of these questions, they were classified as precontemplation.

The statements were modified based on work completed by Snow (1991) who examined the application of the TTM in the area of recovery from alcohol problems. It is basically the same scale used by Hodgins (2001) except that he

Table 1. Process of change questions: item-total correlations, internal consistency estimates, means and standard deviations

Process and items	Corrected item–total correlation	Alpha	Means (SD)	Occasionally/ often/repeatedly use process
Counter-conditioning		.93		
Finding other activities that are a good substitute for video lottery	.63		3.09 (1.40)	69.8%
Doing something else instead of playing video lottery when you are tense	.81		2.62 (1.46)	49.2%
Trying to think about other things when you begin to think about video lottery	.82		2.55 (1.51)	46.0%
Engaging in some physical activity when you are tempted to play video lottery	.79		2.27 (1.38)	36.5%
Trying to relax when you get the urge to play video lottery	.75		2.03 (1.31)	30.1%
Stimulus control		.79		
Avoiding situations that encourage you to play video lottery	.62		3.11 (1.47)	66.7%
Staying away from places generally associated with your video lottery play	.53		3.06 (1.57)	66.7%
Avoiding people who have a problem with video lottery	.64		2.22 (1.34)	38.1%
Leaving places where other people are playing video lottery	.55		1.86 (1.17)	30.1%
Avoiding people who encourage video lottery play	.59		1.95 (1.35)	28.5%
Using reminders to help not play video lottery	.32		1.81 (1.27)	25.4%
Changing your relationships with people who contribute to your video lottery play	.53		1.56 (1.01)	19.1%
Reinforcement management		.68		
Other people in your daily life try to make you feel good about having changed	.42		2.80 (1.47)	60.4%
Countering the temptation to punish yourself for being tempted to play by giving yourself encouragement	.54		2.17 (1.31)	39.6%
Doing something nice for yourself in return for not playing video lottery	.45		2.11 (1.33)	34.9%
Rewarding yourself for small self-changing steps	.46		1.70 (1.20)	23.9%

used 'frequently' rather than 'often' for the fourth point on the scale. Respondents indicated for each item in the processes of change questions how often they used the following methods to help them refrain from playing VLTs. The scale was Never (1), Seldom (2), Occasionally (3), Often (4) or Repeatedly (5). There were five items used for the counterconditioning measure (e.g., engaging in some physical activity when you are tempted to play video lottery). The stimulus control measure used seven statements (e.g., leaving places where other people are playing video lottery). There were four items in the reinforcement management measure (e.g., doing something nice for yourself in return for not playing video lottery). The complete list of statements may be found in Table 1.

Measurement of Self Efficacy and Temptation

To assess self-efficacy and temptation, respondents were asked to indicate in a number of situations how tempted they would be to play video lottery in the situation and how confident they were that they could refrain or not play video lottery if the situation arose. The scale for both measures was Not At All (1), Not Very (2), Moderately (3), Very (4) or Extremely (5). Typical situations mentioned included when you are feeling depressed, when you see others playing video lottery, when you feel the urge to play video lottery, when you are feeling really good, when you have the urge to have just one spin and when you are bored. The complete list of statements may be found in Table 2.

Results

The estimates of internal consistency based on coefficient alpha were 0.93 for counterconditioning, 0.79 for environment control and 0.68 for reinforcement management (Table 1). The mean usage ratings ranged from 1.56 for changing your relationships with people who contribute to your video lottery play, to a high of 3.09 for finding other activities that are a good substitute for video lottery. The percent of problem gamblers in the action and maintenance stages who used the elements within the processes occasionally or more often ranged from a low of 19.1% to a high of 69.8% with a median of 37.3%.

Principal Components Analysis was conducted on the items in each of the self-efficacy and temptation scales in order to determine whether for VL gambling it is appropriate to treat these items as capturing one or more dimensions (Table 2). A single factor emerged as the most interpretable solution for both scales. In the case of self-efficacy, all statements loaded on the first factor with only one loading below .50 (at .46) and an average loading of .69. The case for a single factor in the situational temptation scale was equally strong, with only two measures loading below .50 (.46 and .43) and an average loading of .66. A single value, the average response across all 27 items, was therefore calculated for each of these scales. Previously, the coefficient alphas for these measures have been found to be in the 0.97 range (Clark *et al.*, 1991). Similarly, the coefficient alphas for the two measures in this study were very high, at 0.95.

The short version of the stage of change measure identified 25 respondents in the action stage of change and 38 in the maintenance stage of change. Only 12.0% of those in the action stage had ever contacted any formal sources of assistance or treatment for gambling problems (Gambler's Anonymous, drug dependency/detox or community counselor). Reported use of formal treatment and/or problem gambling support services increased to 21.1% among those identified at the maintenance stage of the recovery process. ($z = 1.53$, $p = - .063$, 1 tailed).

Table 3 presents the results of t-tests comparing those in the action stage to those in the maintenance stage for each scale. Four of the five differences are significant at the $p < .05$ level with use of two processes; counterconditioning ($t = 2.24$, $df = 61$, $p = .014$) and stimulus control ($t = 2.45$, $df = 61$, $p = .008$) declining as hypothesised. Self efficacy increased ($t = 1.99$, $df = 59$, $p = .026$) and temptation declined ($t = 3.42$, $df = 59$, $p = .000$) as hypothesised.

Figure 1 illustrates how the use of the processes of change declines between the action and maintenance stages. Paired comparison tests were used to

Table 2. Principal components analysis of self-efficacy and temptation items

Self-efficacy and situational temptation items (confident or tempted when …)	Corrected item-total correlation	Mean (standard deviation)	Corrected item-total correlation	Mean (standard deviation)
When you are feeling angry inside	.55	1.77 (1.11)	.57	4.32 (.88)
When you are feeling depressed	.51	2.03 (1.19)	.56	4.11 (1.01)
When you see others playing video lottery	.56	2.40 (1.21)	.47	3.92 (1.00)
When you feel the urge to play video lottery	.58	2.81 (1.27)	.46	3.60 (1.29)
When you are feeling really good	.58	1.52 (.94)	.66	4.34 (.89)
When you have the urge to have just one spin	.59	2.27 (1.22)	.56	3.89 (1.13)
When you are bored	.57	2.06 (1.25)	.69	4.08 (1.03)
When you are worried about something	.64	1.56 (.99)	.72	4.23 (1.03)
When you think you have overcome your problems with video lottery	.68	1.74 (1.02)	.74	4.32 (.83)
When you want to test your willpower	.62	1.77 (1.12)	.69	4.29 (.80)
When you are celebrating a special occasion	.59	1.60 (.93)	.72	4.27 (.98)
When you are lonely	.52	1.82 (1.19)	.64	4.29 (.89)
When you feel a physical need for video lottery	.63	2.05 (1.27)	.64	4.13 (1.05)
When things are going really well	.66	1.55 (.99)	.70	4.27 (.94)
When other people encourage you to play video lottery	.43	1.94 (1.11)	.64	4.08 (1.01)
When you have seen an ad about gambling	.48	1.26 (.65)	.62	4.47 (.74)
When you become overconfident about your abstinence	.63	1.77 (1.03)	.78	4.24 (.86)
When you are passing a video lottery establishment	.64	1.95 (1.14)	.66	4.26 (.97)
When you are with friends you used to play video lottery with	.61	1.82 (1.15)	.62	4.24 (.95)
When you are feeling really positive about the way things are going for you	.64	1.56 (.93)	.73	4.29 (.84)
When you are nervous	.68	1.58 (1.03)	.68	4.55 (.62)
When you feel like having a good time	.75	1.65 (1.13)	.78	4.35 (.83)
When you have a strong urge to play video lottery	.58	2.84 (1.45)	.54	3.58 (1.30)
When you think you can play video lottery without any problems again	.76	2.21 (1.26)	.66	3.98 (1.09)
When you are in a situation where you used to play video lottery	.66	2.50 (1.26)	.66	3.77 (1.12)
When you are really happy	.70	1.45 (.92)	.65	4.40 (.86)
When you want to see how far you can push yourself	.72	1.56 (1.05)	.71	4.44 (.64)

Table 3. Comparison of those in the action stage to those in the maintenance stage in terms of counterconditioning, stimulus control, reinforcement management, self-efficacy and temptation

	Action n = 25	Maintenance n = 38	t	df	Sig. (1-tailed)
Counterconditioning	2.90	2.23	2.24	61	.014
Stimulus control	2.38	1.90	2.45	61	.008
Reinforcement management	2.30	2.10	0.82	61	.208
Self-efficacy/confidence	3.99	4.32	1.99	59	.026
Temptation	2.22	1.64	3.42	59	.000

identify significant differences in the ranking of the processes at the two stages. During the action stage, counterconditioning is used more often than stimulus control ($t = 2.1$, $df = 24$, $p = .023$) and reinforcement management ($t = 2.62$, $df = 24$, $p = .008$). At the maintenance stage there is some indication that stimulus control is used less than both counterconditioning ($t = 1.78$, $df = 37$, $p = .042$) and reinforcement management ($t = 1.63$, $df = 37$, $p = .056$).

Figure 2 illustrates the divergent nature of the self-efficacy and temptation measures between the action and maintenance stages, with confidence increasing ($t = 1.99$, $df = 59$, $p = .026$) and temptation decreasing ($t = 3.42$, $df = 59$, $p = .000$), as hypothesised.

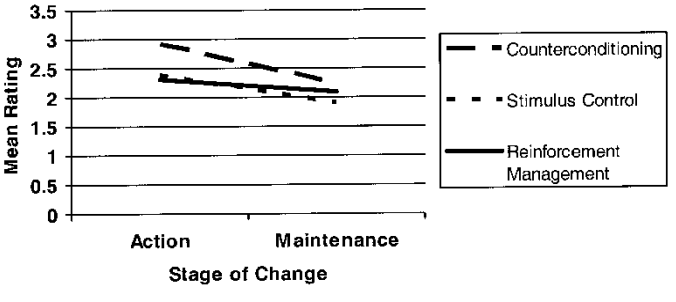

Figure 1. Mean rating of counterconditioning, stimulus control and reinforcement management for those in the action and maintenance stage of change

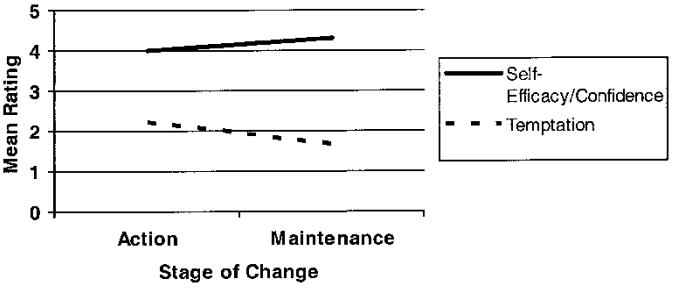

Figure 2. Changes in self-efficacy and situational temptation between the action and maintenance stages of change

Discussion

The principal purpose of the present study was to examine the potential usefulness of the stages of change model in the area of problem gambling. Three processes (counterconditioning, stimulus control and reinforcement management) were measured with respondents in two stages of change (action and maintenance). Changes in the use of these processes in the hypothesised direction would lend support for the use of the model for problem gambling. Two other measures, self-efficacy and temptation, were also hypothesised to change over the stages in a manner found in other addictions research and confirmation would similarly provide support for applying the TTM model to gambling.

The three measures developed for processes of change were found to be reasonably reliable, although reinforcement management (alpha = .68) was lower than both counterconditioning (alpha = .93) and stimulus control (alpha = .79) suggesting that this measure could be adjusted for improvements. The self-efficacy and temptation measures were both found to be unidimensional with high internal consistency (alpha = .95) observed for each measure.

The hypotheses were generally supported. Both counter-conditioning and stimulus control declined significantly between the action and maintenance stages. For those in the action stage of change, the counterconditioning process was used more than stimulus control and reinforcement management, while at the maintenance stage, stimulus control was used less than either counterconditioning or reinforcement management. No change was found in reinforcement management between the stages. Both the hypotheses concerning the changes in self-efficacy and temptation between stages were supported, with self-efficacy increasing between the stages and temptation declining.

A strength of the current analysis is that it is based on results from a reliable random sample of problem gamblers from the general population rather than treatment populations or convenience samples obtained in a non-random manner. As such the sample should be representative of problem VL gamblers at large in the Nova Scotia population. In general, only a small proportion of those who are experiencing problems with their video lottery gambling seek out treatment or other related services. Moreover, in the current study, it was found that only a minority of those gamblers identified at the Action Stage (|appeq|12%: $\pm$ 12.5% at 95% CL) or Maintenance Stage (|appeq|21%: $\pm$ 12.8% at 95% CL) of the recovery process for problem gambling have ever been in the treatment population. This means that in Nova Scotia about 80% of gamblers reaching the maintenance stage in overcoming a problem with the VLTs are doing so on their own, without any formalised treatment, support service or professional assistance. Therefore, the findings of the analysis also have application in identifying opportunities for facilitating an individual's personal efforts to resolve their gambling problems. This has implications for the role of public policy, regulations, venue/casino practices and public health initiatives in helping to support the natural recovery process.

Traditionally, problem gambling initiatives and outreach have centred on the identification and referral of problem gamblers to treatment programs or support groups. Efforts have been focused on ensuring that gamblers are aware of the signs of problem gambling and where to go when they can no longer cope with the consequences or need to get help in order to change. It appears that support services are sought out as a last resort rather than in efforts to control

or prevent gambling problems, with most of the people experiencing gambling difficulties wanting to solve their problems on their own (Schellinck *et al.*, 2000). Therefore, even though information on how to get help is available in VLT venues, on the machines and through advertising of the provincial helpline, relatively few of these gamblers seek formal assistance. Thus there appears to be more demand and potential for initiatives that support gamblers' personal efforts to manage their gambling than for treatment-based solutions.

Findings in the current study suggest that there are a number of initiatives that may support gamblers in their efforts to moderate or eliminate their VLT gambling and those approaches may have the added benefit of a preventative impact.

With 70% of problem gamblers at least occasionally seeking other activities that are a good substitute for video lottery, counterconditioning is a commonly used process for moving to the maintenance stage. This would support casino-operating strategies of investing and promoting alternative forms of on-site entertainment. Of course the difficulty is in encouraging gamblers who have been gambling for long periods of time to switch to other forms of entertainment. Under the current scenario for how gambling machines are distributed in most jurisdictions (i.e., licensed establishments), it will be difficult to have venue-specific tactics to encourage the problem gambler to substitute other activities without introducing significant regulatory changes to ensure that the individual has sufficient safeguards in place to resist the attraction of the machines in favour of other location activities (i.e., pool, darts, games, music, socialising with friends, eating a meal). For many bars and pubs, other activities would only be available off premises. In the absence of regulatory or machine options that allow gamblers to control expenditure or access to the machines on-site, the results suggest that problem gamblers should be encouraged to leave the venue once they had reached desired limits or to avoid the location altogether. Both of these tactics are difficult to selectively target to problem gamblers and are likely to have repercussions for venue staff and other patrons.

Counter-conditioning may be more effective at present when supported away from the gambling sites, especially by an informal or formal support network. However, community services/education can be encouraged to extend their reach directly to the gambling venues through an on-site presence or through materials that educate players or provide tools for managing their gambling rather than waiting for the gambler to come to them.

Two-thirds of problem gamblers avoid situations, places and people that lead to encouragement to play on the machines. In Nova Scotia, almost all licensed establishments in the province (|appeq| 500 + locations including restaurants bars/pubs and clubs) have gambling machines, so if the gambler's life style includes such venues, then it is almost impossible to avoid exposure to the machines.

As noted for counter-conditioning, one solution is to institute options for players to control access to the machines at the location. This pre-empts the need for them to avoid patronising the locations for other social purposes. Such options can include controlled access gaming areas or modifications to the machines that allow players to self-restrict or set play limits. Regulatory policy could require the machine locations be more isolated from other patrons. Gambler preferences for the machines to be located out of sight of other patrons is well known by venue operators so there are often partitions between the

machines and the main sitting areas which would facilitate the institution of controlled access. Advertising is also an enticement that can be expected to exert a negative impact on those trying to resist the temptation to play the machines. Even if the machines are located in a separate controlled access area, through sound and signs, the gambling is still marketed to those sitting in the rest of the venue. In New South Wales for example there are electronic signs, visible to those in the main areas, which announce large wins and indicate the machine where the win occurred. These signs are specifically designed to draw the bar patron to the machines and may be a problem for those wishing to avoid situations that encourage gambling. Regulators could limit the use of such signage or the machine operators could voluntary remove them from the premises. Other marketing strategies such as player loyalty programs/cards and direct marketing campaigns also may erode problem players ability to resist the appeal of the machines particularity during the action stage of the recovery process when confidence of resisting the temptation to play is more vulnerable. Thus, gambling advertising and marketing must be operated and regulated to safeguard this vulnerability.

Reinforcement management, though cited least often, is still used at least occasionally by 60% of problem gamblers. The role of others in providing support/reward appears particularly common. In the 2000 Regular VL Players Follow-up Study conducted by the Nova Scotia Department of Health (Schellinck *et al.*, 2000) the positive support of family, especially a spouse or partner, was found to be the critical distinguishing feature for successful resolution of a VL gambling problem. It was determined that friends and family of problem gamblers make up the majority (Schellinck and Schrans, 1998) or a large percentage (Potenza *et al.*, 2001) of those who call help lines or are seeking assistance from public health providers. During these contacts, it may be useful to emphasise the importance of positive reinforcement as a means of helping the problem gambler. Similarly, literature and messages need to emphasise the positive role of the informal support network and to educate the gambler on how to reward themselves for not gambling or overspending on VLTs as quite often the elimination of the gambling activity has few immediate benefits to the gambler. From a public health perspective, developing and disseminating information that helps gamblers and their families to help themselves outside of treatment appears to represent a significant unmet need at present.

This research did not examine the effectiveness of the three processes in controlling problem gambling. It is clear, however, that problem gamblers are using these processes to effect natural recovery and, therefore, supporting their efforts may be warranted. The ideas put forward here are purposefully focused on non-treatment actions under the assumption that the majority of individuals will not seek out formal assistance/treatment. Nonetheless, considerably more research is needed into the effectiveness of these and similar approaches to supporting the problem gambler in his or her efforts to reach the maintenance stage.

Only selected aspects of the TTM model have been tested, although for the most part, these aspects of the model performed largely as expected leading one to conclude that the model as a whole is likely to be relevant to problem gambling. Further research will be needed to confirm this. The research focused on gambling problems caused primarily by video lottery gambling found in bars, pubs and clubs, not in casinos. It may be that the use of some processes will

vary by the type of gambling causing the problem. For example, stimulus control may be more pronounced for those attempting to control their video lottery gambling than for other forms of gambling where the players are less often exposed to the opportunity to gamble (e.g., black jack). The findings do suggest there is considerable potential among the various gambling stakeholders to support the personal efforts of those trying to overcome a gambling problem.

Acknowledgments

We would like to thank the Nova Scotia Department of Health for permitting us to analyse and publish this research based on the 2000 *Regular VL Players Follow Up* study. Thanks to Louise Sharpe, Michael Walker and Mark Dickerson for comments on earlier drafts of the paper.

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