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Publication details:

Gambling Research

v. 23

Chapter No. 2

pp. 3-16

1832-4975 (ISSN)

Publication Date:

2012

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Comparison of emotion regulation deficits and impulsivity in pathological gamblers and compulsive buyers

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Abstract

Pathological gambling (PG) and compulsive buying (CB) are two disorders characterized by poor impulse-control that share similar phenomenological features such as focused attention, monetary exchange, and gratification. Interestingly, it has been proposed that CB may actually be the female equivalent of PG, therefore other similarities in clinical presentation and associated features should be observed across the two disorders. Specifically, there may be similarities in propensity towards impulsive responding at both the emotional and behavioural level. Due to the high rates of Axis I comorbidity in both disorders, there may also be similarities in coping responses and means of regulating emotional distress. The goals of the present study were therefore to examine the similarities in emotion regulation difficulties, impulsivity, and mindful attention awareness among a sample of pathological gamblers ($n = 23$), compulsive buyers ($n = 26$), and healthy community controls ($n = 24$). Analysis of variance supported specific deficits of emotion regulation that may interact with the observed disposition in both populations to respond rashly in response to negative affective states and to be less mindfully aware. The results emphasize the potential need to address these vulnerabilities in the treatment of both disorders. Limitations and future directions are discussed.

Keywords: pathological gambling; compulsive buying; emotion regulation; negative urgency; mindfulness

Introduction

Pathological gambling (PG) is currently classified as an impulse-control disorder characterized by a loss of control over gambling, deception about the extent of one's involvement with gambling, and significant family or job disruption (American Psychiatric Association, 1994). Pathological gambling demonstrates high comorbidity with other Axis I disorders, including substance use disorders and mood disorders (Crockford & el-Guebaly, 1998), with estimates of 13% - 78% of gamblers presenting with a comorbid depressive disorder (Black & Shaw, 2008). A recent meta-analysis supports these elevated rates in population-representative samples of both problem and pathological gamblers (Lorains, Cowlishaw, & Thomas, 2011). Rates of PG are generally higher in males, but it has been noted that the gender gap may be narrowing due to the fact that onset typically occurs later in females, but progresses more rapidly (Tavares, Zilberman, Beites, & Gentil, 2001).

Compulsive buying (CB), although not formally classified in the DSM, is considered an impulse-control disorder not otherwise specified and is characterized by a preoccupation with buying or impulses to buy that are experienced as irresistible, intrusive, and uncontrollable. CB is associated with frequent buying of more than can be afforded, of items that are not needed, or shopping for longer periods of time than intended and are not better accounted for by mania (McElroy, Keck, Pope, Smith, & Strakowski, 1994). There is a higher prevalence rate of Axis I disorders in CB compared to that reported in epidemiological samples (de Zwaan, 2011), particularly depression and anxiety

(Christenson, Faber, de Zwaan, Raymond, & et al., 1994; Lejoyeux, Bailly, Moula, Loi, & Adès, 1997; McElroy, et al., 1994). In community studies, CB has been reported to affect men and women equally with prevalence data collected in the United States indicating that approximately 5.8% of males and females report clinically significant CB behaviours (Koran, Faber, Aboujaoude, Large, & Serpe, 2006). Similarly, a recently published study in Germany reported a point prevalence of 6.9% across the genders (Mueller et al., 2010). However, data from clinical studies indicates a gender imbalance in treatment-seekers or those willing to participate in research, with as many as 80% of sample participants being female (Christenson, Faber, & de Zwaan, 1994; McElroy, et al., 1994; O'Guinn & Faber, 1989; Schlosser, Black, Repertinger, & Freet, 1994).

Inclusion of CB in the upcoming DSM-V has been proposed (Hollander & Allen, 2006) and diagnostic issues centre on the question of whether CB should be classified as a disorder of impulsivity or compulsivity. It has been suggested that CB may fit within the proposed obsessive-compulsive spectrum disorders (Hollander, Zohar, Sirovatka, & Regier, 2011), representing an intermediate disorder between obsessive-compulsive disorder (OCD) at the compulsive end and PG at the impulsive end. However, others have highlighted that the key distinction between impulsive and compulsive disorders is the egosyntonic nature of the behaviours performed in PG and CB, that are unlike the egodystonic nature of the rituals and behaviours prompted by thoughts or preoccupations in OCD (Black, Shaw, & Blum, 2010). Support for the placement of CB amongst the impulse control disorders (ICDs) appears stronger. In controlled studies approximately 22% of individuals with CB meet criteria for at least one other ICD (Christenson, et al., 1994; Mueller et al., 2009) with rates of intermittent explosive disorder (IED), kleptomania, and pathological gambling (PG) much higher than in psychiatric inpatients (de Zwaan, 2011). CB is also associated with other disorders which are characterized by impaired impulse control, including substance abuse disorders (Schlosser, et al., 1994) and binge eating (Faber, Christenson, de Zwaan, & Mitchell, 1995). Notably, CB may be most closely related to PG as comorbidity rates range from 8.3-25% (Black & Moyer, 1998; Frost, Meagher, & Riskind, 2001; Grant & Kim, 2003; Specker, Carlson, Edmonson, Johnson, & et al., 1996) and both conditions share similar phenomenologic features such as focused attention, monetary exchange, and gratification (Black, Shaw, & Blum, 2010).

Interestingly, it has been proposed that CB may actually be the female equivalent of PG (Black, et al., 2010), therefore other similarities in clinical presentation and associated features should be observed across the two disorders. Specifically, there may be similarities in propensity towards impulsive responding at both the emotional and behavioural level. Due to the high rates of Axis I comorbidity in both disorders, there may also be similarities in coping responses and means of regulating emotional distress. Indeed, Williams, Grisham, Erskine, and Cassedy (in press) compared a treatment-seeking sample of pathological gamblers to a mixed clinical control group and healthy community group and found that pathological gamblers reported significantly less use of reappraisal as an adaptive emotion-regulation strategy, reported a greater lack of emotional clarity, greater difficulty accessing effective emotion regulation strategies, and increased emotional impulsivity than individuals in the healthy community comparison group. Pathological gamblers also reported a greater lack of emotional awareness compared to both comparison groups. Similarly, Williams and Grisham (in press) compared a group of community-recruited compulsive buyers to a healthy control group and found a similar pattern of results, with compulsive buyers evidencing greater emotion regulation deficits across most domains. While these results suggest that poor emotion regulation may be a shared feature of PG and CB, investigation of emotion regulation deficits in a clinical sample of compulsive buyers is still needed.

In addition, new developments in the assessment of impulsivity have highlighted the specificity of certain sub-components of impulsiveness in the prediction of maladaptive behaviours (Billieux, Gay, Rochat, & Van der Linden, 2010; Cyders & Smith, 2007). Notably, negative urgency, or the tendency to experience strong or rash reactions in the context of negative affective states (Lynam, Smith, Cyders, Fischer, & Whiteside, 2007; Whiteside & Lynam, 2001) has demonstrated specific associations with gambling behaviours (Whiteside, Lynam, Miller, & Reynolds, 2005) and compulsive buying (Billieux, Rochat, Rebetz, & Van der Linden, 2008; Williams & Grisham, in press). It remains unclear, however, whether these two populations share a similar profile in terms of overall impulsiveness, and in terms of specific facets of impulsivity.

Finally, the concept of mindfulness, or mindful attention awareness, has received increased research attention as a possible mechanism to partially account for problematic behaviours such as PG and CB. Lakey, Campbell, Brown, and Goodie (2007) demonstrated that mindfulness was associated with less severe gambling outcomes in an undergraduate student sample and suggested that mindful attentional awareness may facilitate adaptive behavioural regulation by influencing the way in which individuals respond to their thoughts and associated urges about gambling and related

behaviours. Additionally, individuals scoring highly on measures of CB have been found to report less mindful attention awareness which, in turn, correlates with specific deficits in emotion regulation (Williams & Grisham, in press). Although these studies provide preliminary support for the role of mindfulness attentional focus in PG and CB, replication in clinical samples is required.

Considering the proposed link between PG and CB the goals of the present study were therefore 1) to replicate and extend the findings of Williams et al. (in press) of specific emotion regulation deficits in a sample of pathological gamblers, 2) to directly compare pathological gamblers and compulsive buyers on measures of emotion regulation, and behavioural and emotional impulsivity while controlling for general levels of impulsivity and psychopathology, and 3) to support the role of mindful attention awareness in both disorders.

Method

Participants

(a) Pathological gambling group

This group included 14 males and 9 females with a mean age of 39.43 ($SD = 11.83$) who met DSM-IV-TR criteria for pathological gambling based on a structured clinical interview. South Oaks Gambling Screen (SOGS) scores ranged from 8 to 20 with a mean of 15.30 ($SD = 4.03$). Current and lifetime diagnostic information obtained from the full Structured Clinical Interview for DSM Disorders (SCID-I/NP Non-patient Edition; First, Spitzer, Gibbon, & Williams, 2002) is presented in Table 1.

(b) Compulsive buying group

This group included 24 females and 2 males with a mean age of 28.31 ($SD = 11.47$) who all met proposed DSM criteria (McElroy, Keck, Pope, Smith, & Strakowski, 1994) and SCID Impulse Control Disorder criteria for compulsive buying. Current and lifetime diagnostic information is presented in Table 1.

(c) Healthy control group

Twenty-five individuals who did not endorse any current or lifetime mood, anxiety, substance-abuse, head injury, psychotic disorder, or gambling pathology were initially included in this group. One participant who scored above the cut-off score of 5 on the SOGS was excluded resulting in a final sample of 19 females and 5 males with a mean age of 28.88 ($SD = 5.84$).

Table 1. Current and lifetime Axis I diagnoses for the pathological gambling group and the compulsive buying group

Diagnosis	Pathological Gamblers		Compulsive Buyers	
	Current <i>n</i> (%)	Lifetime <i>n</i> (%)	Current <i>n</i> (%)	Lifetime <i>n</i> (%)
Mood Disorder	5 (22%)	10 (43%)	6 (23%)	13 (50%)
Major Depressive Disorder	5 (22%)	10 (43%)	5 (19%)	13 (50%)
Dysthymic Disorder	0 (0)	0 (0)	1 (4%)	0 (0)
Anxiety Disorder	5 (22%)	9 (39%)	14 (54%)	2 (8%)
Social Phobia	1 (4%)	1 (4%)	1 (4%)	0 (0)
Generalized Anxiety Disorder	2 (8%)	1 (4%)	5 (19%)	0 (0)
Panic Disorder	0 (0)	1 (4%)	0 (0)	1 (3%)
Panic with Agoraphobia	0 (0)	3 (13%)	1 (3%)	1 (3%)
Obsessive-Compulsive Disorder	1 (4%)	0 (0)	2 (7%)	0 (0)
Specific Phobia	1 (4%)	2 (8%)	4 (15%)	0 (0)
Post Traumatic Stress Disorder	0 (0)	1 (4%)	1 (3%)	0 (0)
Skin Picking Disorder	0 (0)	0 (0)	1 (3%)	1 (3%)
Intermittent Explosive Disorder	1 (4%)	0 (0)	0 (0)	0 (0)
Alcohol Abuse/Dependency	0 (0)	5 (22%)	0 (0)	0 (0)
Substance Abuse/Dependency	0 (0)	2 (8%)	0 (0)	0 (0)
Bulimia Nervosa	0 (0)	0 (0)	1 (3%)	0 (0)

Note. The PG and CB group did not differ in terms of current comorbidity, $\chi^2(1) = .74$, $p > .05$. Percentage do not sum to 100 due to multiple comorbidities.

Measures

(a) *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004)

The DERS assesses six facets of difficulties in regulating emotions: 1) nonacceptance of emotional responses (e.g. “when I’m upset, I become angry with myself for feeling that way”), 2) difficulties engaging in goal-directed behaviour (e.g. “when I’m upset I have difficulty getting work done”), 3) impulse control difficulties (e.g. “when I’m upset I lose control over my behaviours”), 4) lack of emotional awareness (e.g. “I pay attention to how I feel”- reverse coded) , 5) limited access to effective emotion regulation strategies (e.g. “when I’m upset, my emotions feel overwhelming”), and 6) lack of emotional clarity (e.g. “I am confused about how I feel”). The DERS has high internal consistency, good test-retest reliability, and adequate construct and predictive validity (Gratz & Roemer, 2004). Cronbach’s alphas in the current sample were .91, .63, .88, .85, .92, .85, for the respective subscales.

(b) *The UPPS-P Impulsivity Scale* (UPPS-P; Lynam, et al., 2007)

The full UPPS-P is a 59-item inventory designed to measure five distinct aspects of impulsivity: Negative Urgency, (lack of) Perseverance, (lack of) Premeditation, Sensation Seeking, and Positive Urgency. The subscales demonstrate good psychometric properties (Cyders & Smith, 2007). Only the negative Urgency, Premeditation, and Perseverance subscales were used in the current study with corresponding Cronbach’s alphas of .90, .88, and .84, respectively.

(c) *Barratt Impulsiveness Scale* (BIS-II; Patton, Stanford, & Barratt, 1995)

The BIS-II is a widely-used 30-item self-report questionnaire of impulsivity with good psychometric properties (Stanford et al., 2009). Cronbach’s alpha was .83 in the current sample.

(d) *The Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003)

The MAAS is a validated 15-item scale designed to assess attention to and awareness of one’s emotions, thoughts, actions, and surroundings in the present moment. It does not assess other attributes associated with mindfulness such as compassion or acceptance. Higher scores reflect greater mindfulness. Cronbach’s alpha was .89 in the current sample.

(e) *Depression Anxiety Stress Scales* (DASS; Lovibond & Lovibond, 1995)

The DASS is a validated and widely-used 21-item self-report measure of depression, anxiety and stress symptoms with good reliability and internal consistency (Henry & Crawford, 2005). Cronbach’s alpha was .95 in the current sample.

(f) *The Yale Brown Obsessive Compulsive Scale – Shopping Version* (YBOCS-SV; Monahan, Black, & Gabel, 1996)

The YBOCS-SV is a 10-item measure of preoccupations, behaviours, and subsequent distress associated with compulsive buying. It has shown promise as an index of compulsive buying severity that is sensitive to clinical change (Black, Monahan, & Gabel, 1997). Cronbach’s alpha was .92 in the current sample.

(g) *The South Oaks Gambling Screen* (SOGS; Lesieur & Blume, 1987)

The SOGS is the most widely used instrument for assessing problem gambling (e.g. National Research Council, 1999). Scores range from 0 to 20, with scores ≥ 5 indicative of probable pathological gambling (Lesieur and Blume, 1987). Typically, a moderate to high correlation exists between SOGS scores, DSM criteria, and other indices of gambling frequency and severity (Petry, 2003; Stinchfield, 2002). Cronbach’s alpha was .85 in the current sample.

(h) *Structured Clinical Interview for DSM Disorders* (SCID-I/NP Non-patient Edition; First et al., 2002)

The SCID is a semi-structured interview for making the major DSM-IV Axis I diagnoses. The SCID was used to determine current and lifetime history in the clinical groups.

- (i) *Structured Clinical Interview for DSM-IV-TR (SCID) for impulse-control disorders not elsewhere classified* (SCID-ICD; First, 2008, draft)

The SCID-ICD contains 6 modules for disorders of impulse-control currently in the DSM-IV-TR (intermittent explosive disorder, kleptomania, pyromania, trichotillomania, ICD-NOS, and pathological gambling) as well as 4 modules not currently defined in the DSM (impulsive-compulsive buying, impulsive-compulsive non-paraphilic sexual behaviour, impulsive-compulsive internet use, and impulsive-compulsive skin picking). The pathological gambling and impulsive-compulsive buying modules were used to help substantiate classification of participants in the PG and CB groups. Inter-rater agreement (Kappa) calculated on a proportion ($n = 18$) of interviews was .94.

- (j) *Structured Clinical Interview for DSM Disorders- Screening Module* (SCID-I/NP; First, Spitzer, Gibbon, & Williams, 2002)

The SCID screening module was used to screen participants recruited from the community and to rule out any history of Axis I symptoms in the healthy control group.

Procedure

Participants were recruited via advertisements placed in the community either targeting individuals with no current or lifetime history of mental health concerns to participate in a study of buying behaviours, or through advertisements placed on mental health websites and in a local gambling treatment unit seeking individuals with symptoms consistent with compulsive buying or pathological gambling. All participants were initially screened over telephone by a registered psychologist using the screening module of the SCID-I/NP, and those who endorsed symptoms consistent with CB or PG also were screened using the relevant module of the SCID-ICD. Current substance abuse, history of head injury, and psychotic disorder were exclusion criteria for all participants. Eligible respondents were then invited to attend a research session where they completed the battery of self-report questionnaires, full SCID (clinical groups only), and behavioural tasks (to be reported elsewhere). Both versions of the SCID were administered by either the author (AW) or the research assistant (AW-S), both of whom are registered psychologists with extensive experience in diagnostic assessments for clinical and research purposes. Ethical approval was obtained by the Human Research Ethics Committee of St. Vincent's Hospital and the University of New South Wales. Informed consent was obtained for each participant and a small financial reimbursement was provided in exchange for participants' time. Interested individuals in the two clinical groups were provided with information on local treatment facilities and advised to discuss treatment options with their general practitioner.

Results

Investigation of demographic characteristics revealed that participants in the PG were significantly older than participants in the CB and HC groups, $F(2, 70) = 7.90, p < .01$. There was also an imbalance of males and females, $\chi^2(2) = 17.94, p < .05$. The age difference is not unexpected given that research suggests that CB has an earlier age of onset compared to PG (Black, et al., 2010). However, gender differences have been reported across the DERS such that males score significantly higher on the DERS Awareness subscale (indicating greater lack of emotional awareness) compared to females (see Gratz & Roemer, 2004). Correlations and independent samples t -tests were therefore first conducted. Importantly, neither age nor gender correlated with any of the dependent variables, all p 's $> .05$. Only the DERS Awareness subscale demonstrated a weak relationship with age, $r = .27, p = .02$, which was non-significant after adjusting for multiple comparisons. There were also no between-group gender differences, all t 's < 1.69 , all p 's $> .05$. Age and gender did not appear to relate meaningfully to the primary variables of interest, therefore separate MANOVA and ANOVA analyses were then conducted with planned comparisons. Means and standard deviations for the group comparisons are reported in Table 2.

Table 2. Planned comparisons of groups on self-report measures

	Pathological Gamblers <i>M (SD)</i>	Compulsive Buyers <i>M (SD)</i>	Healthy Controls <i>M (SD)</i>	<i>F</i>
SOGS	15.30 (4.03) ^a	1.53 (3.07) ^b	1.00 (1.21) ^b	172.51***
YBOCS-SV	8.78 (7.51) ^a	14.69 (5.25) ^b	5.20 (5.57) ^a	15.23***
BIS Total	72.95 (10.83) ^a	70.82 (12.12) ^a	61.22 (8.42) ^b	6.62**
DASS TOTAL	38.00 (23.57) ^a	37.23 (26.82) ^a	13.16 (13.02) ^b	9.86***
DERS Nonacceptance	14.65 (5.34) ^a	16.26 (6.47) ^a	10.25 (4.77) ^b	7.58***
DERS Goals	14.73 (3.64) ^a	16.23 (4.07) ^a	11.87 (2.73) ^b	9.64***
DERS Impulse	13.91 (4.96) ^a	15.15 (5.78) ^a	8.08 (2.20) ^b	16.38***
DERS Awareness	17.65 (6.40) ^a	15.84 (5.81) ^{a,b}	13.95 (3.72) ^b	2.71 ^{p = .07}
DERS Strategies	20.43 (7.89) ^a	21.92 (9.09) ^a	12.25 (3.92) ^b	12.22***
DERS Clarity	11.65 (3.74) ^{a,b}	13.42 (4.87) ^a	9.83 (2.76) ^b	5.21**
UPPS Urgency	33.08 (4.76) ^a	32.53 (6.08) ^a	22.37 (5.92) ^b	27.46***
UPPS Premeditation	26.13 (6.46)	23.76 (6.85)	22.87 (5.57)	1.65
UPPS Perseverance	23.69 (4.53) ^a	20.00 (5.47) ^b	19.79 (5.47) ^b	4.20*
MAAS	3.39 (.62) ^a	3.32 (.84) ^a	4.23 (.75) ^b	11.19***

Note. SOGS = South Oaks Gambling Screen; YBOCS-SV = The Yale Brown Obsessive Compulsive Scale – Shopping Version; BIS = Barratt Impulsiveness Scale; DASS = Depression Anxiety Stress Scales; DERS = Difficulties in Emotion Regulation Scale; UPPS = The UPPS-P Impulsivity Scale; MAAS = The Mindful Attention Awareness Scale. Means with different superscripts are significantly different. * $p < .05$, ** $p < .01$, *** $p < .001$

On the measures of gambling and buying pathology it was expected that the two clinical groups would score differentially on these measures. For the SOGS there was a main effect of Group, $F(2, 70) = 172.51, p < .001$. As expected the PG group scored significantly higher than both the CB and HC groups, p 's $< .001$, whose scores did not differ, $p > .05$. For the YBOCS-SV there was a main effect of Group, $F(2, 70) = 15.23, p < .001$. As expected the CB group scored significantly higher than both the PG and HC groups, p 's $< .001$, whose scores did not differ, $p = .05$.

Main effects for the DERS, $F(12, 130) = 3.21, p = .001$, UPPS, $F(6, 136) = 9.14, p < .001$, and MASS, $F(2, 70) = 11.09, p < .001$, were all significant. Univariate planned contrasts are reported in Table 2 and demonstrate that as expected there were no differences in DERS subscale scores between the CB and PG group, all p 's $> .05$. On the UPPS, there were no between-group difference for (lack of) Premeditation, p 's $> .05$, but the PG group scored significantly higher on (lack of) Perseverance compared to the CB and HC groups, p 's $< .05$. On the MAAS, there was no difference between the CB and PG group, $p > .05$.

To ensure that the similarity in mean scores across the two clinical groups was not simply attributable to high levels of general psychopathology, analyses were conducted between the PG and CB group with DASS Total as a covariate (there was no difference in DASS Total between the CB and PG group, $p > .05$). The results remained unchanged, with no group differences emerging on the DERS, $F(6, 41) = 1.49, p > .05$, UPPS, $F(3, 44) = 2.07, p > .05$, or the MAAS, $F(1, 46) = .19, p > .05$. In addition, to ensure that the similarity in mean scores across the two clinical groups was not simply attributable to general levels of impulsivity, analyses were conducted between the PG and CB group with BIS Total as a covariate (there was no difference in BIS Total between the CB and PG group, $p > .05$). The results remained unchanged, with no group differences emerging on the DERS, $F(6, 38) = 1.17, p > .05$, UPPS, $F(3, 41) = 2.00, p > .05$, or the MAAS, $F(1, 43) = .42, p > .05$.

Discussion

The current study compared pathological gamblers and compulsive buyers who reported comparable levels of general psychopathology and trait impulsivity on emotion regulation, deficits and specific facets of impulsivity, and mindful attention awareness. With respect to the overall findings group differences, as expected the PG and CB group evidenced similar deficits across all domains of the DERS. Both clinical groups reported comparable levels of non-acceptance of emotions, difficulty engaging in goal-directed behaviour, emotional impulsivity, and limited access to effective emotion regulation strategies in comparison to the healthy control group. The two clinical groups also did not differ in terms of lack of awareness of emotions or clarity and understanding of emotions, although interpretation of these two results is less clear given the CB group scored similarly to the HC group on DERS Awareness and the PG group scored similarly to the HC group on DERS Clarity. In terms of impulsivity, the two clinical groups did not differ on BIS-II total. The PG group did, however, demonstrate a greater deficit in perseverance compared to both comparison groups, which is consistent with research that supports a general association between problem gambling behaviours and impulsivity (Blaszczynski, Steel, & McConaghy, 1997; Castellani & Rugle, 1995; Steel & Blaszczynski, 1998). Negative urgency scores (or the tendency to respond rashly when confronted with negative affective states) were comparable in the two clinical groups and significantly higher than the control group. Finally, as expected both clinical groups reported lower levels of mindful attentional awareness in comparison to the control group. Collectively, the results support specific deficits of emotion regulation in both pathological gamblers and compulsive buyers that may interact with the observed disposition in both populations to respond rashly in response to negative affective states.

The findings of the current study point to several potential clinical implications. The concept of emotion regulation features in many models of psychopathology (Campbell-Sills & Barlow, 2007). Given that both gamblers and compulsive buyers demonstrated limited access to effective strategies for managing difficult emotions, it may be important for clinicians to explicitly address emotion regulation as part of any comprehensive treatment package. Awareness of the impact of emotion regulation strategies on behavioural responding may not only be important so that clinicians can identify deficits in clients, but more importantly, so that clinicians can help prepare clients against relapse. The ability to tolerate distress (a component of emotion regulation) has been associated with increased length of abstinence from gambling (Daughters, Lejuez, Kahler, Strong, & Brown, 2005). Consideration of the impact of emotion regulation strategies on behaviour may be particularly important when elevated levels of negative urgency are also present, as was the case in the current sample. Pathological gamblers and compulsive buyers may be at an increased risk of relapse if their default tendency is to respond rashly when confronted with aversive emotional experiences. Emotion

regulation (ER) training is increasingly being incorporated into cognitive-behavioural therapies for a range of Axis I disorders with promising outcomes (Berkling et al., 2008). If subsequent research supports the role of poor emotion regulation in PG and CB it may be beneficial to incorporate explicit ER training into existing treatment packages.

The current findings of the relationship of mindful attention focus to PG and CB may have similar treatment implications. Cognitive behavioural therapy (CBT) approaches have been relatively well-established as an effective treatment for problem gambling (Petry et al., 2006; Sylvain, Ladouceur, & Boisvert, 1997; Toneatto & Ladoceur, 2003) and evidence is accruing for the appropriateness of CBT for CB (Mitchell, 2011; Mitchell, Burgard, Faber, Crosby, & de Zwaan, 2006). However, as noted by Toneatto and Millar (2004), treatment non-response and relapse in PG remains a problem with standard CBT, therefore consideration should be given to alternative therapeutic strategies that could enhance clinical outcomes. One such alternative may be mindfulness. Mindfulness essentially teaches individuals to observe thoughts, feelings, and sensations without judgement (Segal, Williams, & Teasdale, 2002), therefore mindfulness-based strategies may be useful in interrupting behavioural responses to the cognitive biases and distortions that characterize gambler's thinking (Toneatto, 2002). Research in gambling has already demonstrated that mindfulness is associated with less severe gambling outcomes and it has been suggested that mindfulness may promote a more accurate assessment of gambling that highlights the risks and negative consequences rather than the potential rewards (Lakey et al., 2007). A similar process could operate in the context of CB where mindfulness strategies may assist individuals in identifying high-risk emotional states that then enable individuals to react with more adaptive coping responses. Mindfulness training has also demonstrated efficacy in the treatment of disorders that are highly comorbid with both PG and CB (Teasdale, 1999; Bowen et al., 2009; Brewer, Bowen, Smith, Marlatt, & Potenza, 2010; Kabat-Zinn, Massion, Kristeller, Peterson, & et al., 1992), therefore mindfulness may be particularly appropriate when gamblers or compulsive buyers present with multiple psychopathologies. Indeed, de Lisle, Dowling, and Allen (2011) suggest that mindfulness-based CBT may be particularly effective for problem gamblers with comorbid disorders or where other treatments have failed. Mindfulness may not be a suitable adjunct to standard therapy for all pathological gamblers, particularly the impulsive subtype (Blaszczynski & Nower, 2002), as it requires considerable commitment and practice. Future research may benefit from delineating which subtype of gamblers (and possibly compulsive buyers) responds best to these proposed combination therapies.

The potential clinical implications need to be considered in light of the limitations of the current study. The cross-sectional nature of the data precludes inferences about causality. As noted elsewhere (Williams et al., in press), it may be that deficits in emotion regulation increase one's vulnerability to engage in escape behaviours such as gambling, or alternatively, that coping resources and the ability to effectively regulate one's emotions becomes depleted following continued engagement in behaviours that are associated with adverse consequences. In addition, although information regarding clinical comorbidity was assessed through structured clinical interviews, the time course or onset of problematic gambling behaviours was not assessed. Therefore it is unknown whether gambling behaviours escalated to clinical levels prior to the development of associated mood and anxiety disorders, or whether, as postulated by some models (Blaszczynski & Nower, 2002), that pre-existing psychopathologies predate the development of PG in some gamblers and play a direct role in the maintenance of PG. Future studies that employ prospective designs, or at a minimum attempt to assess the order of onset, would help address this issue. In addition, future studies would benefit from comparing gamblers and compulsive buyers who present without comorbid mood and anxiety disorders. It may be that gamblers who fit Blaszczynski and Nower's (2002) emotionally-vulnerable subtype are those who are indeed more reliant upon specific maladaptive emotion regulation strategies such as those discussed here, compared to gamblers with no pre-morbid psychopathology who may utilize gambling behaviours to reduce negative affectivity, irrespective of their coping repertoire.

Finally, the disproportionate numbers of males and females across the two clinical groups may limit the generalizability of the findings to female gamblers and male compulsive buyers. Although gender did not correlate with any of the primary variables of interest in the current study, future research may benefit from recruitment of more gender-balanced samples.

Acknowledgement

Funding for this study was provided by a National Health and Medical Research Council (NHMRC) of Australia Fellowship (630746) and a UNSW Faculty of Medicine Fellowship Enhancement Scheme awarded to Alishia D Williams. The Author would like to thank Alicia Erskine and the St. Vincent's Hospital Gambling Treatment Program for assistance in recruitment and Aliza Werner-Seidler for research assistance.

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