Psychiatry Research 262 (2018) 282–289

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Gender differences in temporal relationships between gambling urge and cognitions in treatment-seeking adults

Phoebe Dunsmuir, David Smith, A.Kate Fairweather-Schmidt*, Ben Riley, Malcolm Battersby

Flinders Human Behaviour and Health Research Unit, Department of Psychiatry, Flinders University, GPO Box 2100, Adelaide, South Australia 5001, Australia

ARTICLE INFO

Keywords:
Gambling disorder
Urge
Cognitions
Cognitive-behavioral therapy
Gender
Moderating effects
Path analysis

ABSTRACT

Many gambling-specific CBT programs seek to target either gambling-related urge or cognitions or both. However, little is known of the influence of one symptom type on another across time and whether these differ for men and women help-seeking problem gamblers. The aim of this study was threefold: to determine presence of measurement invariance for urge and cognition measures over time; to investigate the effect of baseline urge on end-of-treatment gambling-related cognitions – and the reciprocal relationship; and, identify whether these pathways differ across gender. Self-reported gambling urge (GUS), and gambling-related cognitions (GRCS) data from treatment-seeking problem gamblers prior to and post treatment (N = 223; 62% men) were analyzed with cross-lagged panel models, moderated by gender. Conceptualization of urge and cognitions were found to be temporally stable. There was no significant association between baseline GUS scores and post-treatment GRCS scores, nor the reverse relationship. Putatively, this infers that coexisting urge and gambling-related cognition components of problem gambling operate independently over time. Analyses revealed gambling urge had a significantly stronger tracking correlation across time for men than women when adjusting for cognition paths. This investigation provides early evidence for tailoring CBT in response to sub-population gambling-related characteristics, demonstrated across men and women.

1. Introduction

Problem gambling (PG) is widely acknowledged to result in significant personal and public consequences (Battersby et al., 2006; Blaszczynski and Nower, 2002; Lorains et al., 2011) This includes financial debt, relationship breakdown, comorbid substance use, illegal activity, and despite PG prevalence being relatively low (e.g., rates for 12 months range between 0.2% and 5.3%), the extent of lost productivity is nonetheless significant (Fong, 2005; Productivity Commission, 2010; Wardle et al., 2007). However, relatively few (i.e., ~10%) seek professional help (Cunningham, 2005; Pulford et al., 2009) for their gambling problems, and those who do, experience a high relapse rate – a common characteristic among sufferers of addiction-related disorders (Brorson et al., 2013; Melville et al., 2007). By specifically adapting and tailoring interventions to correspond with subpopulation characteristics (such as gender), it may be possible to enhance the rapidity of symptom improvement, therapy adherence, and overall therapy outcomes – particularly in relation to future relapse (Suurvali et al., 2010).

Gambling-specific cognitive behavioral therapy (CBT) currently comprises a promising evidence-based therapy for PG (Cowlishaw et al., 2012; Gooding and Tarrier, 2009). While a combination of exposure and cognitive therapy (ET and CT, respectively) has been shown to improve both gambling-related urge and cognitions, presently there is no specific research base providing evidence to demonstrate the mechanism by which cognitive and exposure therapy work together in a combined CBT treatment package. In other words, *do* urge and cognitive concepts interact under the influence of CBT? Although a number of papers have discussed neurobiological and cognitive trajectories at a theoretical level (e.g., Blaszczynski and Nower, 2002; Brevers and Noël, 2013), current evidence (examined below) is still widely based on cross-sectional data.

Two well-known integrative models inform PG research and therapy: the Pathways model (Blaszczynski and Nower, 2002), and the Biopsychosocial model (Sharpe, 2002). Both models robustly identify and describe postulated causes of gambling disorders. Both models are also based upon cognitive-behavioral and diathesis-stress foundations, but importantly, they differ in relation to the conceptualization of gambling disorder population characteristics. The Biopsychosocial perspective considers those with gambling disorder as being essentially

* Correspondence to: Flinders Human Behaviour and Health Research Unit, Psychiatry, College of Medicine & Public Health, Flinders University, GPO Box 2100, Adelaide, South Australia 5001, Australia.
E-mail address: Kate.Fairweather-Schmidt@flinders.edu.au (A.K. Fairweather-Schmidt).

https://doi.org/10.1016/j.psychres.2018.02.028
Received 27 March 2017; Received in revised form 4 December 2017; Accepted 13 February 2018
Available online 15 February 2018
0165-1781/

homogeneous, contrasting with the Pathways model which proposes three discrete routes of PG development, where *subpopulations* are described as possessing differing chronology and co-morbid psychological pathologies.

A burgeoning body of research is supportive of the Pathways model's distinct subpopulations perspective observes gambling motivations and associated features to vary by gender (Grant et al., 2012; Hing et al., 2016b). It may be pertinent at this point to note that recent guidelines describe the use of the terms relating 'gender' (man/men, and woman/women): gender incorporates the social, environmental, cultural and behavioral domains which have a bearing upon each individual's self-identification as a man or woman, and their respective health outcomes (Heidari et al., 2016). Gender appears to be linked to both gambling type and other psychiatric problems: (mid-age/older) women problem gamblers with psychiatric comorbidities prefer electronic gaming machines (EGMs), while (younger) men, often with comorbid substance abuse, favor sports betting/gambling (Clark, 2010; Hodgins et al., 2011; Husky et al., 2015; Petry, 2003). Notably, women gamblers commonly report using gambling as an escape from loneliness and depression (Getty et al., 2000; Trevorrow and Moore, 1998). This corresponds to Blaszczynski and Nower's (2002)'Pathway 2' ('*emotionally vulnerable problem gamblers* – who present with premorbid anxiety and/or depression, a history of poor coping skills, and negative family background experiences, developmental variables and life events', p. 97). In contrast, men gamblers are attracted to the sensation-seeking and competitive elements described in 'Pathway 3' ('*anti-social impulsivist problem gamblers* – distinguished by features of impulsivity and antisocial personality disorder…behavioral problems independent of their gambling, including substance abuse, suicidality, irritability, low tolerance for boredom and criminal behaviours', p. 97).

Key symptoms of PG include physiological arousal and subjective excitement, particularly for men, as noted above. These features underpin urge (or craving), and, combined with mutual neurobiological factors, comprise the transdiagnostic elements uniting PG with substance use disorders (SUD). The psychophysiological response to gambling 'near misses' (similar to a drug 'hit') reinforces the urge maintaining gambling behavior (akin to substance addiction). Neuroimaging research already demonstrates correspondence between the strength of gambling urge and subsequent changes in neural activity, incorporating retrieval and processing of emotion and impulse regulation (Balodis et al., 2012; Potenza et al., 2003). A recent review addressing neural correlates of cognitive control in gambling disorder has now implicated impaired prefrontal cortex activity, and highlights the probable interaction of mood and stress with cognitive control and/or motivational drive (i.e., urge) (Di Nicola et al., 2010; Moccia et al., 2017). Thus, urge is postulated to associate with poor emotion regulation and deficient coping strategies (Michalczuk et al., 2011; Moccia et al., 2017; Williams et al., 2012).

Interestingly, investigations employing psychological measures suggest urge varies systematically by gender, where a stronger relationship between urge and gambling severity found for men (Smith et al., 2015). Aside from urge, cognitive distortions, such as erroneous beliefs about one's chances of success (implicated in risk-taking), or possessing the capacity to influence betting outcomes, are central PG *cognitive* features. These are assessed with cognition specific measures for gambling, such as Gambling Attitudes and Beliefs Survey-23 (Bouju et al., 2014) and the Gambling Related Cognition Scale (GRCS; Raylu and Oei, 2004b). Gambling-related cognitions, including gambling expectancies (GE; e.g., "Having a gamble helps reduce tension and stress"; Raylu and Oei, 2004b) appear to be mediated by 'escapist motivation' (Balodis et al., 2014; Bonnaire et al., 2009; Thomas et al., 2009), an effect found to be stronger in women. Further, interpretive bias (IB; e.g., "Relating my winnings to my skill and ability makes me continue gambling") varies between men and women in the general community (Raylu and Oei, 2004b). However, this body of research is based on cross-sectional methodology, and in order to robustly investigate these gender-based differences in GE and IB, further testing of Smith et al. (2015)'s findings remains to be undertaken using longitudinal data.

Recent neurocognitive-based investigations continue to reveal gender variability, including the recruitment of cognitive strategies and neural networks. For example, examination of putative mechanisms underpinning observed gender disparities in reward-based decision-making highlight a tendency for women to focus on the overall *rate* of gains and losses. In contrast, men concentrate on the *extremity* of the gains and losses and long-term decision-associated outcomes (Byrne and Worthy, 2016). Singh (2016) suggests it is possible that the aforementioned variability, and other cognitive strategy differences, are influenced by sex-specific lateralization. Hormonal-induced right-brain lateralization appears also to be implicated: minor increases in cortisol levels in women seems to enhance performance on the Iowa Gambling Task via right hemisphere activation (van den Bos et al., 2009). In contrast, boosting levels of cortisol functioned to increase *risk-taking* behavior in men, but not in women (Kluen et al., 2017).

The body of research described above provides a robust justification for investigating the longitudinal relationship between key PG constructs implicated in PG to understand how cognitive and behavioral constructs (e.g., gambling urge and cognitions) relate during therapy disaggregated by gender. Surprisingly, extant research has rarely adopted a subpopulation-nuanced approach, despite the fact that in doing so findings may reveal important implications for therapy choice and delivery methods. Thus, the overall objective of the present study is to investigate a hypothesized temporal reciprocal relationship between psychophysiological (i.e., urge as measured by Gambling Urge Scale (GUS; Raylu and Oei, 2004a; Smith et al., 2013) and cognitive factors (assessed with GRCS) to delineate therapeutic response indicators from CBT treatment completers using pre-and post-treatment data, and whether this varies across gender among PG. Importantly, the first objective must be to determine the stability over time of participants' conceptualization of the underlying gambling-related urge, expectations and interpretative bias constructs (operationalized by comparing responses to GUS, GRCS-GE, GRCS-IB items across two time points) by assessing measurement invariance. The second, and main study objective, investigates hypothesized cognitive-exposure mechanisms underpinning PG focused CBT by examining whether (a) baseline symptom severity in gambling urge is associated with change in gambling-related cognitions (GE and IB) – and the reciprocal relationship; and, whether (b) these relationships vary by gender.

2. Methods

2.1. Setting and treatment

An outpatient problem gambling therapy service offers one-on-one therapy and is staffed by a psychiatrist and therapists with a range of professional backgrounds including psychology, mental health nursing or social work. All therapists have both mental health and masters level qualifications in CBT and 3–10 year's therapy experience and received supervision from a registered clinical psychologist with extensive experience in CBT (Ladouceur et al., 2003, 2001) and a consultant psychiatrist (Battersby et al., 2008).

On first presentation patients underwent a 90 min screening interview with the objective of establishing an initial understanding of each patient's current and past gambling behavior, to determine a diagnosis, and formulate a case conceptualization to guide treatment plan formulation. Baseline measures were collected prior to the commencement of the screening interview and reviewed during the interview. The interview comprised a gambling-focused cognitive behavioral assessment, including DSM-IV criteria for identifying problem gambling, and a functional analysis which comprised three components pertaining to a recent gambling episode. These include the autonomic or physiological reaction, the behavior, and the cognitions across three time frames: before, during, and after the gambling session. This served as the basis