



Sensitivity to reward and punishment: Horse race and EGM gamblers compared[☆]



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ARTICLE INFO

Article history:

Received 3 April 2013

Received in revised form 6 August 2013

Accepted 11 August 2013

Available online 5 September 2013

Keywords:

Horse race gambling

EGM gambling

Reward Sensitivity Theory

Pathways model of gambling

ABSTRACT

Horse race and electronic gaming machine (EGM) gambling are popular forms of gambling, however the key motivational drivers to participation in these different forms are not clear. Gray (1982) and Gray & McNaughton (2000) Reward Sensitivity theory (RST) and Blaszczynski and Nower's (2002) cognitive behavioural pathways model of pathological gambling (PG) provide potential frameworks for examining these drivers. The aim of this study was to explore the relationships between gambling choice, gambling frequency and personality factors deriving from the models of Gray (sensitivity to reward, sensitivity to punishment), and Blaszczynski and Nower (sensation seeking, impulsivity, escapist motivation). The sample comprised 118 current gamblers who gambled twice or more per year on either horse racing or EGMs (77 male, 41 female, M_{age} 26.93 years). Horse race and EGM gamblers showed very different patterns of correlates. Horse race gambling frequency was independently predicted by male gender and sensitivity to reward, while the significant independent predictors of EGM gambling were escapist motivation and sensitivity to punishment. Results provide support for conceptualising frequent gamblers as a heterogeneous group with respect to their motivational drivers, with gambling preferences offering an important indicator of underlying motivations for gambling.

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1. Introduction

Given the popularity of gambling and its potential to result in problems for some people, it is important to understand psychological processes that drive this activity. Many studies have examined personality factors associated with problem gambling (MacLaren, Fugelsang, Harrigan, & Dixon, 2011), but few take the approach of the current study, to question whether these factors differ among those attracted to different gambling forms. This paper focuses on two different types of gambling; electronic gaming machine (EGM) and horse racing betting. Both are popular and associated with heightened risk for gambling problems (Binde, 2009; Productivity Commission, 2010). However, it has been argued that fundamental differences in the games and their environments mean that players attracted to these games are differentially motivated (Thomas, Sullivan, & Allen, 2009; Wood & Griffiths, 2007).

One promising approach to examining individual differences in gambling motivation comes from Gray's (Gray, 1982; Gray & McNaughton, 2000) Reinforcement Sensitivity Theory (RST). The key tenet of this theory is that two separate neurological mechanisms underlie individual differences in sensitivity to reward and punishment. The Behavioural Approach System (BAS), is an appetitive system responsible for motivating 'approach' behaviour and active pursuit of reward in the presence of stimuli signalling reward, excitement or positive affect. The BAS underpins sensation-seeking, with those high on BAS sensitivities seen as at-risk for addictions because of their strong desires for the positive reinforcements associated with many addictive behaviours (Eitle & Taylor, 2010). Nevertheless, recent literature is divided on whether sensation seeking is elevated for pathological gamblers. Support for this relationship is ambiguous, some studies showing positive or limited relationships (e.g. Bonnaire, Bungener, & Varescon, 2006, 2009; Coventry & Constable, 1999; Moore & Ohtsuka, 1997) while others have not supported this link (e.g. Blanco, Orensanz-Munoz, Blanco-Jerez, & Saiz-Ruiz, 1996; MacLaren et al., 2011). Differences have been attributed to variations in measures used (Parke, Griffiths, & Irwing, 2004) and type of gambling population studied (Bonnaire, Bungener, & Varescon, 2006, 2009; Coventry & Brown, 1993).

The second neurological mechanism proposed by Gray (1982), the Behavioural Inhibition System (BIS), is an aversive system,

[☆] This paper was adapted from a thesis that formed part of the Post Graduate Diploma in Psychology (Swinburne University) by the first author. The thesis was supervised by the second and third authors, who also contributed to writing the paper.

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described as responsible for controlling and inhibiting behaviour. It functions through regulating one's actions to avoid states of conflict, and is highly sensitive to stimuli associated with outcomes of threat, frustrative non-reward or punishment (Torrubia, Ávila, Moltó, & Caseras, 2001). In Gray's revised theory (Gray & McNaughton, 2000), another biological system, the flight-fright-freezing system (FFFS), provides the basis for behavioural responses to aversive stimuli such as threat of punishment. It might be assumed that those high on BIS would avoid gambling altogether (flight) because of the high likelihood of loss, but several studies have shown that gambling may satisfy needs other than the desire to win, for example individuals may gamble as an escape from anxiety and stress (Thomas et al., 2009; Weatherly, 2013). The BIS may underpin attempts to avoid unpleasant outcomes or emotional states in ways similar to those ascribed to an overlapping concept, 'escapist motivation', that is, through avoidant strategies such as getting drunk, or 'switching off' by engaging in so-called mindless activities as distraction from stress. Thus the 'flight' may be from anxiety and stress rather than gambling losses in the case of BIS dominated gamblers.

To date, few studies have applied Gray's RST framework to directly examine gambling behaviour. There is equivocal support for BAS as a motivator of gambling. Studies by Brunborg, Johnsen, Mentzoni, Molde, and Pallesen (2011) and Demaree, DeDonno, Burns, and Everhart (2008) both found that BAS scores correlated with average wager on simulated slot machine games. MacLaren, Fugelsang, Harrigan, and Dixon (2012) showed three out of four BAS subscales correlated with problem gambling among Canadian slot machine players. Eitle and Taylor (2010) also found BAS scores correlated positively with self-reported 'largest gambling loss per day' among young males, however, problem gambling scores and largest loss per year were not correlated with BAS. O'Connor, Stewart and Watt (2009) found no relationship between BAS scores and self-reported gambling behaviour among their sizeable sample of undergraduates. Gambling literature relating to BIS is even more inconsistent. While Demaree et al. (2008) study found a negative relationship between BIS and average wager on simulated slots, Brunborg et al. (2011), Eitle and Taylor (2010) and O'Connor et al. (2009) found no relationships between BIS and any of their gambling measures.

In short, research using the RST framework to examine gambling behaviours has had inconsistent results. One explanation may be that different gambling forms are attractive to those with different patterns of reinforcement sensitivity. Gambling activities vary markedly in terms of their environmental contexts, and level of risk and reward. The RST model is intended to be reflective of specific behavioural cues and conditions, so its application to 'gambling in general' may lead to conflicting results depending on samples selected and their preferred gambling activities. A small study by Blaszczynski, Winter, and McConaghy (1986) demonstrated that horse race gambling addicts had significantly lower baseline (pre-gamble) levels of beta endorphins than EGM players and controls, suggesting the possibility of different reward pathways in the brain underpinning different types of gambling preference, an idea consistent with BIS/BAS theory. The speculation that, for horse race gamblers, betting on and watching a race would raise their endorphin levels was not supported by the Blaszczynski et al. study, however the authors postulated that this could be due to the relatively small bet size failing to raise excitement levels.

The Pathways Model of Problem and Pathological Gambling (Blaszczynski & Nower, 2002) is a theoretical framework that encapsulates the notion that all gamblers are not alike. Problem gamblers are depicted as driven to gamble by differing biological, social and environmental needs, the satisfaction of which is likely to vary depending on the form of gambling chosen. To date, research has supported the existence of two of the subtypes

proposed by Blaszczynski and Nower; the *Emotionally Vulnerable Gambler* and *Antisocial Impulsivist Gambler* (Bonnaire et al., 2009; Ledgerwood & Petry, 2006).

The Antisocial Impulsivist Gambler prefers active games and participates in gambling primarily to generate excitement and maintain heightened states of arousal (Blaszczynski & Nower, 2002). Horse race gamblers appear to fit this type, with research consistently showing they have higher sensation seeking scores than other types of gamblers (Bonnaire et al., 2006; Coventry & Brown, 1993; Parke et al., 2004; Slowo, 1997). It is possible that the gradual build up in excitement during a horse race is particularly rewarding for those seeking increased arousal. It has been suggested that high sensation seekers will run the risk of monetary loss for the positive reinforcement of highly arousing states experienced through uncertainty and novelty of a potential win (Demaree et al., 2008). Individuals high in sensation seeking may be driven to gamble for reinforcement by these rewards because of a strong BAS. Impulsivity is another defining dimension of the Antisocial Impulsivist Gambler, reflecting their needs for immediate gratification of rewards. This personality trait relates to frequent and problem gambling (e.g., Clarke, 2005). We suggest therefore that frequent horse race gamblers are more likely to be BAS driven and fit the profile of the Antisocial Impulsivist Gambler, thus scoring highly on impulsivity and sensation seeking in comparison with less active types of gamblers.

The Emotionally Vulnerable Gambler (Blaszczynski & Nower, 2002) is characterised as choosing passive gaming forms such as EGMs, and primarily gambles for cognitive distraction to avoid negative emotional experiences, rather than to generate excitement. For example, more frequent EGM gambling has been associated with lower sensation seeking (Bonnaire, Lejoyeux, & Dardennes, 2004; Coventry & Constable, 1999), while frequent and problem EGM gamblers often score higher on avoidance coping scales (e.g., Getty, Watson, & Frisch, 2000; Thomas & Moore, 2003) and are more likely to have experienced recent or serious life stressors (Thomas et al., 2009; Wood & Griffiths, 2007). Specifically, recent research shows that frequent and problem EGM gamblers have a greater tendency to gamble as a way of escaping from their problems (Thomas, Allen, Phillips, & Karantzas, 2011). Gamblers who experience escapism and dissociative states through their avoidance coping behaviours may be further drawn, through negative reinforcement (avoidance of punishment), towards these non-conflict states by high levels of BIS. We therefore suggest that frequent EGM gamblers will be BIS dominated and tend to fit the profile of the Emotionally Vulnerable Gambler, with heightened levels of escapist motivation directing their gambling.

The aim of the current research is to test relationships between personality factors (BAS, BIS, sensation seeking, escapist motivation, and impulsivity) and frequency of gambling on horse races and EGMs. These two different types of gambling were compared because of their different game characteristics and social contexts, the expectation being that frequent gamblers in each mode would show significantly different personality profiles. On this basis, it was predicted that horse race gambling frequency would be positively related to sensitivity to reward (BAS), sensation seeking and impulsivity, and that EGM gambling frequency would be positively related to sensitivity to punishment (BIS) and escapist motivation, and negatively related to sensation seeking.

2. Method

2.1. Participants

Participants were 76 men and 41 women, aged 18–72 years ($M = 26.93$, $SD = 9.99$); 92% were born in Australia. Recruitment

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