

# The Psychology of Gambling

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## Executive summary

Gambling has been a component of mainstream Australian culture since colonisation. It is a major entertainment and tourism industry, and a valued source of revenue to government and private enterprise. Nevertheless, for those Australians who are problem gamblers, along with their families and communities, gambling is the cause of considerable harm. Psychology, as a science and profession, has much to offer in understanding gambling behaviour.

Gambling involves the staking of an item of value on an outcome that is governed by chance, and comprises a wide range of commercial activities, including lotteries, electronic gaming machines, casino games, racing and sports-betting. Almost all forms of commercial gambling are designed to provide a negative return to players, that is, a relative advantage to the house or gambling operator.

Gambling venues and activities are highly accessible throughout Australia and 70-80% of Australians gamble at least once a year.

Gambling is a regulated industry with statutory regulatory bodies in each jurisdiction. Nevertheless, there is intrinsic conflict in government regulation of an industry that provides significant revenue to government, and self-regulation that if effective would reduce revenue for private enterprise.

Gambling harm is variably defined. A public health approach argues for assessment of harm on a continuum and determined at individual, family and community levels. Harm can be personal, social, vocational, financial and legal. The DSM-IV-TR takes a diagnostic and medical approach in classifying pathological gambling as an impulse control disorder, with many diagnostic items based on those founding traditional addiction models including tolerance, withdrawal, and difficulty controlling urges.

The Productivity Commission (2009) estimated that between 90,000 and 170,000 Australian adults (0.5 – 1%) suffer significant gambling problems, a further 230,000 to 350,000 (1.4 – 2.1%) are at moderate risk for problem gambling, and many more people (family members, work colleagues) are indirectly affected by problem gambling. Men, younger people, those who come from a family with a problem-gambling parent, Indigenous Australians and those from some ethnic minorities are most likely to

experience gambling problems. Problem gambling has a high level of co-occurrence with mental health and substance use problems.

Continuous forms of gambling, such as electronic gaming machines, racing and casino tables, are most likely to be associated with problem gambling. Electronic gaming machines are the mode of gambling associated with the greatest level of harm.

The main measure to assess problem gambling in the community is the Problem Gambling Severity Index of the Canadian Problem Gambling Index. The South Oaks Gambling Screen, which was designed as a clinical measure, is also used.

People are motivated to gamble recreationally by the desire for excitement and arousal, and relief from stress and negative mood. Knowledge of the factors that affect gambling participation across the lifespan is quite limited.

There is no widely accepted causal explanation or single theoretical model that adequately accounts for the aetiology of problem gambling. Learning theory, cognitive models, and neurophysiological models all have some evidence base. Very little evidence supports personality or psycho-analytic explanations.

Integrated models comprising biopsychosocial and pathways approaches are supported by emerging evidence, leading to a framework identifying at least three primary subgroups of gamblers: behaviourally conditioned, emotionally vulnerable, and biologically-based impulsive.

A public health perspective, considering problem gambling as a community and public health issue, supports a harm minimisation approach. Although hampered by the lack of an operational definition of harm, this approach focusses on risk and protective factors to prevent and reduce gambling harm.

Primary prevention approaches have generally relied on educational campaigns to increase knowledge, although these are yet to be demonstrated empirically to be effective in achieving subsequent behaviour change.

Secondary prevention approaches address individuals at higher risk and comprise policy initiatives, such as staff training, and modifications to gambling environments and restricting access to cash.

A national approach to responsible gambling has been endorsed by the Council of Australian Governments (COAG), with State and Territory Governments having primary responsibility for regulation of gambling in their jurisdictions, including training of gaming venue staff in responsible gambling provision and encouraging venue-based interventions.

The absence of a unifying theory of problem gambling is reflected in the range of techniques that have been employed in its treatment, and there is some empirical evidence for a number of different interventions.

Although there has been improvement in the evidence base, no psychological treatment satisfies the current standards for evidence of efficacy, and the literature does not provide a strong basis for differentiation of the available treatment options.

Nevertheless, cognitive-behavioural therapies have been cautiously recommended as ‘best practice’ for the psychological treatment of problem gambling.

A substantial body of literature evaluating the efficacy of pharmacological interventions to directly treat problem gambling behaviour has recently emerged, and these appear to be more effective than no treatment or placebo.

Future directions for psychology to improve understanding of gambling behaviour include increased focus on:

- understanding gambling participation using longitudinal designs;
- agreement on the construct and assessment of problem and pathological gambling, and measurement of harm;
- investigation of new aspects of gambling, particularly those enabled via global connection through the internet;
- better evaluation of public health approaches to develop effective primary and secondary prevention;
- improved methodology for treatment studies;
- development of guidelines for evidence-based best-practice in treatment; and
- investigation of forensic implications of the factors that affect problem gambling.

## 1. Introduction

Gambling is an activity that impacts on most Australians: it is embedded within our society as a part of mainstream culture through the entertainment, leisure, sport, and tourism industries; and it is a significant source of revenue to governments and private enterprise. It also comprises a source of considerable harm to some Australians due to its negative impact on individuals, families and communities through problem gambling. Consequently, it is essential that gambling and problem gambling are well understood, and that the regulation of gambling—at individual, community, industry and government levels—is well informed.

Psychology, as a science and profession, has much to contribute to understanding gambling from the perspectives of theory, research and practice. Recognising the critical role of psychology in addressing this important public issue, the APS developed a Position Paper on *The Psychological Aspects of Gambling Behaviour* in 1997. Much has changed in the subsequent decade—opportunities for gambling have expanded and embraced sophisticated new technologies, the scientific understanding of gambling behaviour has grown, and problem gambling has become acknowledged as both a public health and mental health issue.

This paper provides an overview of major developments in understanding gambling from a psychological perspective. It commences with a brief background context and then reviews the associations between gambling and harm. An account of current psychological theories and research that help understand problem gambling behaviour precedes discussion of recent initiatives in reducing gambling harm and treating problem gambling. The conclusion considers future directions for this important public issue.

## 2. Background

### 2.1 Definitions and types of gambling

Gambling involves the staking of an item of value, such as money or property, on an outcome that is determined in part by chance. In some cases, this element of chance is an inevitable feature of the activity itself due to incomplete knowledge (e.g., racing,

sports-betting) or due to the random nature of the outcomes (e.g., lotteries, gaming machines, or casino games). Some forms of speculation (e.g., stock-market trading) may also be considered forms of gambling depending on how people make decisions, although the market is not, by its nature, designed to generate chance-determined or random outcomes. Gambling is generally divided into three categories: (1) Wagering and betting, placing a bet or wager on the outcome of an event such as a sporting event or race; (2) Gaming, which involves placing bets on games that are constrained by mathematically pre-determined rules and theoretical returns of players (gaming machines and casino table games); and (3) Lottery style games, including Cross-Lotto, Powerball, Pools, scratch tickets and Keno, all of which award prizes based on the selection of winning symbol or number combinations (Delfabbro & LeCouteur, 2008).

Almost all of these forms of gambling are designed to provide a negative return to players; that is, players typically should expect to lose a certain percentage of each amount gambled. For example, many Australian gaming machines are set to provide an 85% expected player return rate, which means that over the long-term, 15% of monies cycled through a machine will be retained by the operator for taxation or gross profit. Even lower returns often are observed in keno and race betting, although racing and sports returns are not predesigned to converge on a long-run expected outcome as is the case in gaming machines. Casino table games such as blackjack and poker typically provide much higher returns to player (over 95%). Some activities offer players some opportunity to influence their chance of winning by using skills, knowledge or strategies (e.g., wagering and casino card games), whereas others such as gaming machines, roulette and lotteries have outcomes that are entirely chance-determined. Gambling activities also vary in their frequency and continuity. Some activities (e.g., lotteries) are referred to as non-continuous because draws occur infrequently, whereas gaming machines and casino games allow players to make repeated gambles often in a short period of time (e.g., every 10 seconds on gaming machines on average).

## **2.2 Accessibility and prevalence of gambling in Australia**

Each Australian State and Territory has at least one major casino and every jurisdiction allows access to racing, lottery and gaming machines. Western Australia is the only State where gaming machines are not located in hotels and clubs in the community, and instead restricted to one casino. In Australia, there are over 1,100 gaming tables,

199,271 gaming machines (99,826 in NSW alone), almost 6,000 venues that provide gaming machines, 4,756 lottery outlets and 4,652 TAB outlets (Australian Gaming Council, 2008/09).

Gambling venues are located in suburban areas of all major cities and towns and often have operating hours that extend throughout the night. Of special note, venues tend to be clustered in areas with lower socio-economic status (Livingstone & Woolley, 2007; Marshall & Baker, 2002).

Internet gambling in the form of gambling on interactive gambling sites (e.g., online casinos) is not legal in Australia under the 2001 Interactive Gambling Act 2001, but use of the Internet as a vehicle to place bets on approved forms of gambling, such as sporting events and wagering, is allowed (Australian Gaming Council, 2008/09). Internet and wireless-based gambling is increasing in Australia as elsewhere, and greatly increases accessibility (Australian Gaming Council, 2008).

Population surveys show that around 70-80% of the Australian adult population gambles at least once per year (Productivity Commission, 2009). Approximately 60 per cent of adults gamble on lotteries, a third on scratch tickets, 30 per cent on gaming machines, 20 per cent on racing, and 10 per cent or less on other forms including casino table games and sports betting (Delfabbro & Le Couteur, 2009).

Regular gambling is undertaken by 15% of Australians (excluding those who purchase lotteries and scratch cards) and about 5% gamble regularly on gaming machines. Of the 15% of Australians who gamble regularly, about 10% can be classified as problem gamblers and a further 15% as facing 'moderate risk' (Productivity Commission, 2009). Of the 5% who gamble frequently on activities such as gaming machines, about 15% would be classified as problem gamblers and another 15% experiencing 'moderate risk'.

Overall, 90,000-170,000 Australian adults are estimated to experience significant problems from their gambling (0.5 to 1.0% of adults), with a further 230,000 to 350,000 experiencing moderate risks that may make them vulnerable to problem gambling (1.4 to 2.1% of adults) (Productivity Commission, 2009).

Australians spend over \$18 billion per annum on gambling, or \$1,500 per capita, with 60% of this expenditure being lost on electronic gaming machines (EGMs), mostly located in clubs and hotels (Productivity Commission, 2009). This amount is

considerably higher than in other jurisdictions, such as New Zealand (\$495 per capita), Canada (\$393 per capita) and the United States (\$325 per capita) (Delfabbro, 2010).

Gambling participation rates vary significantly according to age and gender. Men are typically more likely than women to gamble on sports, racing, casino card games and racing, whereas few sex differences in participation tend to be observed in relation to gaming machines and lotteries (Productivity Commission, 2009). Such differences are thought to result from differences in game preferences, knowledge of gaming rules, motivations for gambling and the characteristics of venues (Delfabbro, 2000). Analysis of age-related differences reveals that there are numerically more gamblers in the middle-aged range (40-60 years), but that the probability of gambling decreases during adulthood.

Younger people are significantly more likely to gamble on most forms of gambling (except lotteries and bingo) than older people. For example, in a survey of 17,000 adults in South Australia, it was found that 51% of people aged 18-24 years had gambled on gaming machines in the previous 12 months as compared with 29% of 45-54 year olds and 29% of 65-74% year olds (S.A. Department for Families and Communities, 2005). Under-aged gambling is particularly common: around 60% of young people (13-17 years) report gambling at least once per year (Lambos, Delfabbro, & Pulgies, 2007) and the high prevalence of adolescent gambling requires greater attention (Delfabbro, Lahn, & Grabosky, 2005).

### **2.3 History and regulation of gambling**

It is widely acknowledged that gambling was introduced to Australia alongside with colonisation, although there is some evidence that Aboriginal peoples engaged in some forms of gambling prior to European settlement (Breen, 2007). Since then, there have been four major periods shaping Australian gambling history (Australian Institute for Gambling Research, 1999, p.i):

- the early period of colonisation from 1788-1900;
- a period of selective legalisation from 1900-1940s;
- a period of government endorsement and market growth from the Second World War to the 1970s; and

- a period of commercialisation, competition and market expansion from the 1970s to 1990s.

Although lotteries, racing and betting on card games have existed in Australia for some time, many other forms of gambling are relatively new. The first Australian casino was established at Wrestpoint, Hobart, in 1973 followed by 12 other casinos of various sizes established since then in every Australian jurisdiction. Club and hotel-based gaming machines were legalised in NSW in 1956, the ACT in 1976, and all other jurisdictions except WA in the early to mid 1990s (Australian Gaming Council, 2008/09; Productivity Commission, 2009).

On the whole, gambling is a highly regulated industry. In each jurisdiction, gambling is regulated by specific Acts of parliament and overseen by statutory regulatory bodies that enforce and/or monitor the operation of the relevant legislation. Almost all major industry sectors in the gambling industry incorporate a code of practice designed to promote responsible gambling. In some jurisdictions (SA, NT and ACT), these codes are mandatory and enforced by legislation that provides for penalties for non-compliance; another is co-regulatory (QLD), in that the provisions are developed through collaboration between the government, industry and other stakeholders; and others are voluntary (NSW, TAS and WA).

Notwithstanding these variations, all State and Territory governments have introduced legislated measures to encourage responsible gambling and thereby reduce the potential harms associated with gambling. These measures include requirements for staff training, self-exclusion policies, limits on operating hours and machine numbers, advertising restrictions, limits on game design parameters, and the provision of safe-gaming messages (Delfabbro & Le Couteur, 2009). Industry compliance with these provisions is monitored and evaluated, although the quality of this enforcement and degree of industry collaboration vary significantly between jurisdictions and between venues (Breen, Buultjens, & Hing, 2006; Hing, 2005; McMillen & Pitt, 2005). The Productivity Commission (2009) notes that venues have “muted incentives to address the problems faced by consumers, as this would mean lower profits” (p.xxxii).

### 3. Gambling and harm

The distinction between non-problematic gambling behaviour and gambling harm is contentious, and the lack of agreed and conceptually sound terminology hampers the field. Gambling behaviour occurs on a continuum, from no gambling at all to increasing amounts of participation in gambling activities, which can cause varying levels of harm for individuals, families and communities. Understanding all gambling behaviour should be of interest to psychologists—not just gambling harm—and it has been argued recently that there is much to be gained from a fuller investigation of all types of participation in gambling across the lifecourse (LaPlante, Nelson, LaBrie, & Shaffer, 2008; Rodgers, Caldwell, & Butterworth, 2009). Nevertheless, psychologists tend to be most interested in gambling behaviour that results in harm to the self and others.

The lack of consensus is mostly around the conceptualisation of gambling harm. A number of different terms are used to describe harmful gambling, but ‘problem’ and ‘pathological’ are the two most common. In Australia, problem gambling, or gambling problems, is defined as “difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community” (Neal, Delfabbro, & O’Neil, 2005, p.i). Consistent with a public health approach, this definition views problem gambling on a continuum that encompasses the full spectrum of harm, from mild to severe, and encapsulates the impact of gambling problems on those who gamble, as well as their family and friends, businesses and the community (Korn, Gibbons, & Azmier, 2003). By contrast, the term ‘pathological gambling’ refers to the psychiatric or medical definition from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR), and implies the existence of a diagnosable disorder that is usually defined in terms of a combination of elements considered central to impulse control disorders and traditional addictions, including tolerance, withdrawal, craving, and impaired control, as well as significant disruptions to normal everyday functioning.

It has been argued that use of pathologising terms such as “compulsive”, “pathological”, or “problem gambler” implies that the individual is the problem, rather than taking a broader psycho-social and environmental approach. The term “responsible gambling” has emerged recently from harm minimisation approaches, but is an ambiguous term

that can relate to informed choice, gambling industry initiatives, or have the inference that consumers with gambling problems are irresponsible (Korn, Gibbons, & Azmier, 2003).

### **3.1 Gambling harm**

Gambling can give rise to different types and levels of harm and these can be personal, social, vocational, financial and legal. The most obvious harm is financial, and this is clearly related to many of the other harms. In terms of psychological harm, it has been found that 40-60% of problem gamblers in treatment samples experience clinical depression (Battersby & Tolchard, 1996; MacCallum, Blaszczynski, Joukhador, & Bettie, 1999), display suicidal ideation (Battersby & Tolchard, 1996; Sullivan, Abbott, & McAvoy, 1994), or have significant levels of anxiety (Battersby & Tolchard, 1996). Problem gamblers also have a greater likelihood of engaging in other behaviours that compromise their wellbeing, particularly substance use. Data suggest that 50 – 60% of gamblers smoke compared to 22% of the general population, and that 30 – 40% have a concurrent substance dependence or abuse (MacCallum & Blaszczynski, 2002; Rodda & Cowie, 2005) as well as poorer physical health (Delfabbro & LeCouteur, 2009).

Problem gambling can have significant effects on many aspects of the gambler's life, including their relationships and employment. Many problem gamblers report intimate relationship and family difficulties (Dowling, Smith, & Thomas, 2009a) or having lost or jeopardised relationships as a result of gambling (Dickerson, Boreham, & Harley, 1995; Jackson et al., 1997). Others report having put off activities or neglected their families because of gambling (Productivity Commission, 1999; S.A. Department of Human Services, 2001), and most report having lied to family members or engaged in furtive activities so as to conceal the extent of their gambling and the resultant losses (Productivity Commission, 1999).

Consequently, problem gambling can be particularly devastating for families because the nature and extent of the gambling problem often can be concealed for long periods. Apart from the betrayal of trust that may be felt by families when the problem is finally revealed, the hidden nature of gambling can mean that family finances are depleted before family members have an opportunity to assist the gambler and direct them to treatment.

Similarly, although relatively less is known about the vocational impacts of problem gambling, there is evidence that those affected report having given up time from work to gamble, have lost jobs due to gambling, or have used their workplace to commit crimes to continue funding their gambling (Delfabbro & LeCouteur, 2009; Productivity Commission, 1999; 2009). In a detailed analysis of the offending record of 306 problem gamblers in treatment, Blaszczynski and McConaghy (1994) showed that larceny, embezzlement, and the misappropriation of funds were the most common crimes reported. Many of those who committed these crimes did not have a previous history of conviction and were found to work in white-collar professions that provided them with direct access to money.

### **3.2 Prevalence of problem gambling and risk factors**

Since the 1990s, community studies have been conducted in every jurisdiction as well as nationally (Productivity Commission, 1999) to estimate the prevalence of problem gambling in Australia. Most studies suggest that between 1-2% of the adult population experience significant problems associated with their gambling (Delfabbro & LeCouteur, 2009), although the rate varies depending upon how the study is conducted. In earlier studies using the South Oaks Gambling Screen (see Section 3.6 below), around 1.5-2.0% of the adult population surveyed were identified as problem gamblers. Amid concerns about sampling methodologies and modification of scoring methods, more recent studies using the Canadian Problem Gambling Index (CPGI) provide estimates of between 0.50 and 1.0% (Jackson, Wynne, Dowling, Tomnay, & Thomas, 2009). The Productivity Commission (2009) estimated that between 90,000 and 170,000 Australian adults (0.5 – 1%) suffer significant problems, a further 230,000 to 350,000 (1.4 – 2.1%) are at moderate risk for problem gambling, and many more people (family members, work colleagues) are indirectly affected by problem gambling.

Problem gambling rates vary according to the demographic characteristics of individuals as well as their preferred mode of gambling (Productivity Commission, 2009). As a general rule, men are significantly more likely to be problem gamblers than women (ratio 60:40 in most surveys). Younger people, aged 18-30 years, are usually twice as likely to be problem gamblers as those who are older. Importantly, problem gamblers are more likely to be those who are socially disadvantaged through having

lower incomes or being unemployed. They are also, overall, more likely to be single or separated.

Electronic gaming machines are the form of gambling associated with the most harm. Livingstone and Adams (2010) note that of the \$17.5 billion spent on gambling in 2005-06, 59% was spent on EGMs (Productivity Commission, 2008) and these have been shown to be implicated in around 85% of gambling problems (McMillen, Marshall, Ahmed, & Wenzel, 2004). In 2008-09, 55% of gambling expenditure was on 'pokies' in clubs and hotels and a further 7% in casinos (Productivity Commission, 2010). Furthermore, 94% of the around 200,000 EGMs are located in local clubs and hotels, which have been argued to have a locational bias toward being in areas of relative socio-economic disadvantage (Livingstone, 2001; Marshall & Baker, 2002).

The gambling behaviour of family members, particularly fathers, is an important risk factor, as children raised in families with a problem-gambling family member have an increased risk of developing gambling problems in the future (Dowling, Jackson, Thomas, & Frydenberg, 2010). This effect is separate from the influence of socio-demographic factors, and recent Australian data reveal that people with a family history of problem gambling were between 2.3 and 9.6 times more likely to display problem gambling behaviour than those that did not have that exposure. The risk increases most for those with problem gambling fathers, who were 10.7 to 13.5 times more likely to display problem gambling behavior. Furthermore, between 7.3% and 10% of participants in this national Australian survey reported that they were raised in families with a problem gambling family member.

Indigenous people are more likely to experience gambling problems than non-indigenous people (Young, Barnes, Stevens, Paterson, & Morris, 2007; Young et al., 2006). This greater vulnerability has been attributed to a variety of factors, including the limited range of alternative leisure activities for indigenous people in some urban centres, co-morbidities including greater substance abuse and psychological problems, and the general attractiveness of gambling to communities with lower incomes and fewer other opportunities to earn money.

Another risk factor for problem gambling is the type of activity to which people are exposed. Although problem gamblers typically engage in a wider range of gambling activities than other gamblers, most statistical models show that continuous forms of

gambling, such as gaming machines, racing or casino table games, are most likely to be identified as the cause of problems (Dowling, Smith, & Thomas, 2005; Productivity Commission, 1999). Moreover, because gaming machines are the preferred form of continuous gambling for both sexes, and particularly for women, it is not surprising to find that around 60% of people who experience gambling problems report having difficulties with machine gambling rather than other forms.

Other factors thought to influence the prevalence of problem gambling include the proximity of venues to people's place of residence (Delfabbro & Eltridge, 2008). The presence of peers and family members whose social lives revolve around gambling, and the degree to which gambling is accepted as a legitimate pastime by others in the community, also comprise risks.

### **3.3 Assessing problem gambling**

Pathological gambling was recognised as a clinical disorder in the DSM-III in 1980 and remains in the current DSM-IV-TR (2000) as an impulse control disorder not otherwise classified. Draft proposals for the upcoming fifth edition of the DSM reveal that problem gambling will be classified as an addiction, based on behavioural and biological similarities to substance use disorders. The current DSM-IV-TR classification comprises 10 criteria and requires the endorsement of five or more for a diagnosis of pathological gambling. A number of the items in the DSM-IV are based upon the traditional addiction model for substance use disorders and include items related to tolerance ("Needs to gamble with increasing amounts of money in order to achieve the desired excitement"), withdrawal ("Is restless or irritable when attempting to cut down or stop gambling"), and difficulty controlling urges ("Has repeated unsuccessful efforts to control, cut back, or stop gambling"). Other items relate to preoccupation, chasing losses and the harms associated with pathological gambling.

The DSM-IV is the only recognised clinical tool for diagnosing pathological gambling. It can be administered via a structured interview, in a questionnaire format using the GAMTOMS (Stinchfield & Winters, 2001) or the NODS (National Opinion Research Centre, 1999), or via a mixed interview and question format, such as the Structured Clinical Interview for Pathological Gambling or SCIP developed at the University of Sydney (Walker, Anjoul, Milton, & Shannon, 2006).

The DSM-IV is suitable for use in clinical settings and for forensic reporting because it provides a clinical diagnosis that is more likely to be recognised by courts. However, generally, it is not suitable as a screening tool for population surveys where the intention may be to identify individuals with problems of varying severity as required by public health approaches. In these broader contexts, psychologists have typically used more general screening tools. The two most widely used tools are the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987) and the Problem Gambling Severity Index (PGSI) of the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001), although good quality validation information is also available for the Australian-developed Victorian Gambling Screen (VGS) (Ben-Tovim, Esterman, Tolchard, & Battersby, 2001).

The SOGS is a 20-item scale based largely on the DSM classification with items relating to tolerance, withdrawal and impaired control. It is heavily weighted towards items relating to excessive expenditure (almost half the items relate to sources of funding for gambling). Irrespective of the time-frame used, a cut-off score of 5 or higher indicates probable pathological gambling and, somewhat confusingly, a score of 3-4 indicates problem gambling. In Australia, most psychological researchers have taken a score of 5 to indicate problem gambling because of some scepticism concerning the applicability of the traditional addiction model to gambling behaviour. Despite its widespread usage, particularly in the 1990s, the SOGS has fallen into some disfavour in Australia because of concerns about the high rates of false positives thought to be generated by the measure and the fact that it was developed as a clinical screening tool using a non-gambling sample as a comparison group (Battersby, Thomas, Tolchard, & Esterman, 2002; Lesieur & Blume, 1987). The SOGS' definition of problem gambling is also confusing because it implies that problem gambling is just a less severe form of pathological gambling, which is not consistent with other theoretical conceptualisations where problem gambling is defined as a continuum and pathological gambling as a dichotomy.

The PGSI of the CPGI was developed specifically for use in community prevalence surveys and contains nine items, each of which is scored on a 4-point scale from never (0) to almost always (3). Scores of 8+ indicate problem gambling, 3-7 moderate risk gambling, 1-2 low risk gambling, and 0 = no risk. The CPGI has been adopted as the

method of choice in Australian prevalence research as it appears to have superior psychometric qualities compared with the SOGS (McMillen & Wenzel, 2006). It generates a 'continuum of risk' which is attractive to exponents of a public health approach and is a more conservative measure than the SOGS. Scores of 8+ tend to generate much lower estimates of prevalence than the SOGS (usually less than half the SOGS 5+ rates). Although Svetieva and Walker (2008) have criticized the CPGI for being heavily reliant on the DSM-IV items in its derivation and therefore not truly a measure of 'problem gambling', but rather 'pathological gambling', it is a widely-used tool with good current normative data and often used by psychologists in research studies and as a screening instrument.

## **4. Understanding problem gambling**

### **4.1 Motivation to gamble**

There are many reasons why people gamble recreationally. These may be broadly classified under two non-mutually exclusive types of motivation: the desire for positively reinforcing subjective excitement and arousal; and the desire for the negatively reinforcing relief or escape from stress or negative emotional states. Both social and monetary reward expectancies facilitate gambling due the learnt association with, and capacity to enhance or regulate, positive affect (Shead & Hodgins, 2009).

By its very nature, gambling represents an opportunity to win money, and subject to the potential size of the prize, to change one's lifestyle. The prospect of winning large prizes (expectancies of reward) generates excitement by allowing participants to dream and fantasise about the impact that such a windfall would have on their work, finances, leisure, and capacity to support immediate family members. Smaller wins are also exciting since these provide a gain to the player and enable further gambling in pursuit of larger wins.

Importantly, the form of gambling and the environment in which it is conducted is conducive to social interaction and this adds substantially to its inherent enjoyment. Hotel, club, casino and on-course venues are recreational locations that offer a range of entertainment options (food, beverage and shows). Within these contexts, gamblers can readily meet, interact socially, and test their luck and skill in pleasant and safe

surroundings leading to enhanced social integration and stimulation, self-esteem, and a positive sense of recreation/leisure. Gambling is also a means of overcoming boredom. The capacity for gambling to narrow one's focus of attention (Anderson & Brown, 1984) and produce dissociative states (Jacobs, 1986) accounts for the reason why many individuals use gambling as a maladaptive coping strategy to deal with problems, emotional distress and stress/tension. Gamblers often report that gambling represents a means, albeit temporary, of isolation and distraction from worry, demands and responsibilities, and confronting problems. This is one of the more powerful motivators underpinning persistent gambling in samples of problem gamblers (see Petry, 2005), and forms a central component of a number of psychological models of gambling (Blaszczynski & Nower, 2002; Jacobs, 1986; Sharpe, 2002). The affect-regulation component of gambling is driven by a need to maintain optimal levels of arousal and accounts in part for the selection of certain forms of gambling— low skill activities to alleviate anxiety and stress, and high skill games to generate excitement and elevate mood (Blaszczynski & McConaghy, 1989; Petry 2005).

Evidence suggests that problem and non-problem gamblers have similar motivations to gamble but the motivational strength differs for problem gamblers. In particular, winning money (chasing losses) and relieving tension, stress and emotional distress are implicated in promoting continued gambling (Clarke, Tse, Abbott, Townsend, Kingi, & Manaia, 2007; Platz & Millar, 2001).

There are gaps in our knowledge about gender and age differences in respect to gambling motivations. Some studies have found that females are more likely to gamble in response to intrapsychic factors such as loneliness, depression, and to gain control over their lives and emotional issues. Males respond to external factors such as peer groups, financial pressures and employment related conflicts (Petry, 2005). Others have found no significant gender differences for either commencing or continuing gambling (e.g., Clarke, Tse, Abbott, Townsend, Kingi, & Manaia, 2007). Age differences in gambling motivation are not well understood.

#### **4.2 Major theoretical approaches to understanding problem gambling**

Currently, there is no widely accepted causal explanation or single theoretical model that adequately accounts for the aetiology of problem gambling. A range of internal and

external correlates and predictive risk factors associated with problem gambling has been identified, including but not limited to age, gender, impulsivity, biological/genetic vulnerabilities, family history, peer group interactions, and socio-ecological variables (Blaszczynski & Nower, 2007; Brewer, Grant, & Potenza, 2008; Toneatto & Nguyen, 2007). Explanatory models can be divided into single theory models or integrated multifactorial (biopsychosocial) conceptual frameworks, all of which share common elements.

#### **4.2.1 Learning theory**

The basic tenet of learning models is that gambling is a behaviour governed by contingencies of reinforcement operating under operant and classical conditioning paradigms. Both positive and negative reinforcement increase the probability of a gambling response being elicited and explain persistence in gambling (Anderson & Brown, 1984; Dickerson, 1979; McConaghy, 1980). Winning money generates excitement leading to continued play being rewarded. Similarly, the experience of dissociation enabling the temporary emotional escape from aversive negative affective states represents a negative reinforcer that also motivates continued play. Winning also acts as a second order reinforcer, in that the repeated association of gambling-related paraphernalia and environmental cues (conditional cues) with gambling-induced excitement and arousal (unconditional cues) results in the experience of excitement and arousal following subsequent exposure to unconditioned cues. Under these circumstances, exposure to a broad range of environmental gambling cues is sufficient to elicit states of arousal and trigger urges to gamble.

Importantly, the random ratio reinforcement schedule, whereby there is an element of unpredictability as to whether the next trial will result in a reward, is resistant to extinction and accounts for persistence in play (McConaghy, 1980). Players become reluctant to cease play in case the next trial wins the jackpot. The regret of ceasing play and missing out on a win because of one's 'incorrect' decision is a potentially aversive emotional reaction.

Although learning theories account for some aspects involved in the acquisition and maintenance of gambling, and play a prominent role in other theoretical models, they do not explain why only a small percentage of players progress to problem gambling or the processes that cause escalation from recreational to problematic gambling. In addition,

learning models fail to adequately consider punishment (depression, stress and tension) and response cost (loss of money), which theoretically could lead to a reduction or cessation of play. Thus, although offering some explanation for persistence in gambling and insights into treatment interventions (stimulus control, imaginal desensitisation), pure learning theories are incomplete as a conceptual framework for problem and pathological gambling.

#### **4.2.2 Cognitive models**

The cognitive behavioural model is based on the assumption that erroneous beliefs, cognitive distortions and misunderstanding of concepts related to randomness, probabilities and mutual independence of chance events, and drawing faulty causal associations between events contribute to the aetiology and maintenance of gambling and problem gambling behaviours (Ladouceur & Walker, 1996; Petry, 2005; Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997; Walker, 1992). Although the origin of irrational and erroneous cognitive beliefs and schemas remains unknown, social learning experiences, vicarious and participatory exposure to familial and peer-related gambling, media representations, religiosity and cultural influences, and personal experiences have all been hypothesised to play significant roles (Blaszczynski & Nower, 2007; Griffiths, 1994; Petry, 2005; Ladouceur, Sylvain, Boutin, & Doucet, 2002). These factors serve to shape an individual's attitudes toward, and acceptance of, gambling as recreational activities that offer opportunities to supplement one's income through winning. In addition, the structural characteristics of some forms of gambling, notably electronic gaming devices, fosters the development of certain forms of erroneous beliefs that result in the overestimation or expectation of winning (Dowling et al., 2005).

A number of researchers have identified the range of cognitive distortions using psychometric measures, experimental manipulations, and the 'thinking aloud' technique where verbalisations during play are audio-recorded and analysed for their content (see Ladouceur, Sylvain, Boutin, & Doucet, 2002; Petry, 2005; Toneatto, 2002). Cognitive distortions can be broadly classified as those relating to:

- skill and judgment (illusions of control), which overinflate estimate of personal abilities/skills in influencing the outcome of random events (Langer, 1975);

- possession of personal traits/attributes or ritual behaviours that increases one's probability of winning (luck as a personal attribute, superstitious behaviours and beliefs, belief in the intervention/favour of fate and ancestors, and spiritual/religious response to prayers) (Joukhador, MacCallum, & Blaszczynski, 2003; Joukhador, Blaszczynski, & MacCallum, 2004);
- selective recall and biased memories/evaluation of outcomes leading to the foci of attention to be placed on wins and personal skill with losses discounted or attributed to external unpredicted factors (Gilovich, 1983; Gilovich & Douglas, 1986); and
- erroneous perceptions regarding probabilities, independence of events, and expectations of imminent wins after losing streaks (gambler's fallacy) (Ladouceur, Sylvain, Boutin, & Doucet, 2002; Walker, 1992).

Within the cognitive model, family and social interactions coupled with pre-existing beliefs and attitudes determine the likelihood that an individual will decide to participate following exposure to gambling opportunities. Early wins may result in the belief that gambling is an easy source of income, or, in response to losses, motivate the individual to persist in gambling with the expectation of recouping such losses (chasing losses). Wins serve to reinforce illusions of control and belief in luck/fate, with superstitious beliefs and rituals emerging in response to chance associations between external variables being misinterpreted as causally linked (illusory correlations).

Primary factors that result in persistence in gambling include: wins; the gambler's fallacy (belief that a win is due following a series of losses – a manifest misunderstanding of the law of averages and the law of large numbers); cognitive regret (regret over ceasing prematurely and missing out on the next win); and entrapment (where one is motivated to maintain a course of action having already invested so much to date). The concept of cognitive regret is linked to random ratio schedules of reinforcement where the next trial unpredictably may result in a reward. Optimism bias combined with selective recall of memories of winning, the gambler's fallacy and illusions of control coalesce to increase the gambler's confidence in overestimating chances of winning.

There is ample evidence demonstrating the presence of high rates of irrational and erroneous beliefs in populations of recreational and problem gamblers, although there

are some inconsistent findings among recreational gamblers (see Petry, 2005). Studies have found that up to 80% of verbalisations made by problem gamblers seeking treatment are deemed irrational (Gaboury & Ladouceur, 1989; Ladouceur, Sylvain, Boutin, & Doucet, 2002) and that such irrational beliefs are independent of the individual's statistical knowledge (Behnsain & Ladouceur, 2004).

Cognitive theories have growing empirical support, and cognitive behavioural interventions have shown positive outcomes ranging up to 85% over 12 months or longer (see Hodgins & Holub, 2007; Petry, 2005). Nevertheless, cognitive theories have yet to explain the functional interaction between arousal, conditioning, and cognitive activity, or the transition from recreational to problem gambling.

#### **4.2.3 Addiction models**

Although formally classified in DSM-IV as a disorder of impulse control, the addiction model is presently the dominant theoretical paradigm explaining pathological gambling (Blaszczynski & Nower, 2002; National Research Council, 1999). This is reflected in DSM's decision to incorporate modified items used in substance dependence in the criteria set used to diagnose pathological gambling (Lesieur & Rosenthal, 1991).

Historically, the use of the term 'addiction' was restricted to the recurrent use of external drugs characterised by the presence of excessive preoccupations, cravings and overwhelming compulsive urges to consume the substance, negative consequences associated with its use, withdrawal following cessation and tolerance—features of neuro-adaptation (American Psychiatric Association, 2000; Volkow & Fowler, 2000). More recently, 'dependence' has supplanted the use of 'addiction', with the descriptor extended to apply to a broader range of non-substance *behavioural addictions*, including gambling (Holden, 2001). Within this context, pathological gambling is viewed as a 'natural addiction' characterised by the compulsive consumption of non-substance derived rewards (Tamminga & Nestler, 2006).

The addiction model of gambling is based on the similarities in motivation, patterns of behaviour, and consequences found among substance use disorders. Problem gamblers report excessive preoccupations with and persistent urges to gamble, repeated participation in gambling despite serious negative consequences, withdrawal and tolerance, and impaired control evidenced by repeated unsuccessful attempts to cease.

Gambling takes on an increased salience in their lives where the activity takes precedence over familial and other social obligations.

Lending weight to the addiction model is epidemiological survey data and clinical studies describing high rates of comorbidity between pathological gambling and substance abuse (see Petry, 2005). Similarities in neurobiological activity and genetic abnormalities found among gamblers and those who are substance dependent involving cortico-meso-limbic brain structures suggest common molecular pathways (Goudriaan, Oosterlaan, de Beurs, & Van den Brink, 2004). Although serotonin (linked to impulsivity) and noradrenaline (linked to arousal) have been implicated, there is emerging evidence that dopaminergic neurotransmitter sensitivity within the ventral tegmental and nucleus accumbens, and possibly the stimulation of opioid peptides, are important factors (Tammenga & Nestler, 2006). The dopaminergic system, postulated to be associated with reward and reinforcement, coupled with hippocampal memory traces and dopaminergic projections into the frontal lobe higher executive regions, are hypothesised to interact to influence mood, motivation, reward memories and decision-making processes (Goudriaan, Oosterlaan, deBeurs, & Van den Brink, 2004; see also reviews by Raylu & Oei, 2002; Shah, Potenza, & Eisen, 2004).

Supporting evidence for the biological basis of pathological gambling as an addiction is also found in pharmacological studies demonstrating Naltrexone, an opioid antagonist, to be effective in blocking the reinforcing effects of gambling similar to drugs, the capacity for Parkinson's disease medication (dopamine agonists) to induce pathological gambling behaviours (Dodd, Klos, Bower, Geda, Josephs, & Ahlskog, 2006), similarities in poor performance on ventromedial-prefrontal-cortical-related tasks, and temporal discounting decision-making between gamblers and drug addicts (Holden, 2001; Shah, Potenza, & Eisen, 2004).

Accordingly, these findings have led to pathological gambling being described as an 'addiction without the drug' (Potenza, Steinberg, McLaughlin, Wu, Rounsaville, & O'Malley, 2001), and Lesieur and Rosenthal (1991) asserting that with the exception of chasing losses, all diagnostic criteria "...have their counterpart in alcohol, heroin, cocaine and other forms of substance drug dependence" (p.7).

However, as noted by Raylu and Oei (2002), although similarities have been found between substance dependence and pathological gamblers, caution must be exercised in

concluding a causal link between biological markers and pathological gambling. Many associations are correlational in nature and neurobiological changes may reflect the consequence of repeated exposure to arousal and affective-laden stimuli and behaviours. Nevertheless, this is a promising area warranting further longitudinal studies.

#### **4.2.4 Personality theory**

There is no typical personality profile found among problem or pathological gamblers. A number of studies have found elevated scores on some personality traits, such as impulsivity, with inconsistent findings on others, such as sensation seeking (see Raylu & Oei, 2002 for a review). There is no consistent finding in relation to extraversion, neuroticism and locus of control. However, while no personality profile exists, specific traits, particularly impulsivity, sensation-seeking and propensity for risk taking, may be important variables moderating or modulating gambling behaviour and acting as risk factors in the aetiology of pathological gambling.

Although existing studies have reported high rates of Axis II personality disorders among populations of pathological gamblers in treatment (Specker, Carlson, Edmonson, Johnson, & Marcotte, 1996) and in the community (Desai & Potenza, 2008), particularly those falling within the Cluster B category (narcissistic, antisocial and borderline), there are no coherent or unique patterns emerging. In addition, some anti-social features may develop as a result of the stresses caused by gambling-related problems and the strategies used to conceal these from others.

#### **4.2.5 Psycho-analytical approaches**

There is no single cohesive psychodynamic or psychoanalytic theory that has been advanced to explain the development of problem gambling. Historically, psychoanalytic interest on the topic can be dated to von Hattinger's (1914) published case study. Subsequent case studies variably referred to complex intrapsychic processes or conflicts that sexualised gambling, pointed to inherent states of psychoneuroses leading to regression to pre-genital psychosexual phases of development and regressive infantile behaviour, desire for longed-for erotic satisfaction and fulfilment of primitive superego demands, and narcissistic appeals to fate, lady luck and destiny (Bergler, 1957).

Given the reliance on clinical case material and absence of empirically testable hypotheses, psychoanalytic models are generally considered to be of limited utility in explaining either the onset and maintenance of problem and pathological gambling, or as a foundation for clinical interventions (Cornish, 1978; Rosecrance, 1985), with the exception of Rosenthal and Rugle's (1994) support of insight-oriented supportive therapy .

#### **4.2.6 Integrated models**

In response to the multiplicity of environmental, familial, and intrapsychic variables identified, several integrated explanatory models have been advanced. Early theorists such as Jacobs (1986) and Brown (1997) offered more general theories of addiction that also encompassed gambling. These focused on the two-factor processes of maintenance of hedonic tone or optimal/homeostatic levels of arousal, the role of personality traits, and psychological predisposition to feelings of inadequacy, self-esteem and self-efficacy. Excitement/arousal produced positive hedonic tone while dissociation and narrowing of attention underpinned emotional escape. Substantial evidence exists that gambling produces dissociation (Diskin & Hodgins, 2003).

Reformulating her earlier biopsychosocial model (Sharpe & Tarrier, 1993), Sharpe (2002) proposed a descriptive stress-diathesis model that attempted to take into consideration all of the following: predisposing genetic and biological vulnerabilities; environmental influences setting the foundation for attitudes toward, and exposure to, gambling; peer group interactions; early gambling win/loss experiences; and, the interactive role of arousal (conditioning), cognitive biases and coping strategies.

Blaszczynski and Nower (2002) based their integrated model on the assumption that pathological gamblers represented a heterogeneous group that could be sub-typed according to underlying motivation and benefits derived from gambling. The model identifies three primary subgroups or clusters of gamblers: behaviourally conditioned, emotionally vulnerable, and biologically-based impulsive. It is assumed that all subtypes manifest similar symptoms and signs but that there are important differences in the pathogenesis of the disorder. Similar to Sharpe (2002), the model accepts the relevance of environmental factors in shaping early attitudes toward gambling, and the central role of arousal, conditioning and cognitive distortions as variables are common to all three subtypes. However, the point of departure from Sharpe's model is in the

importance placed on additional factors that discriminate subtypes. For the behaviourally conditioned subgroup, conditioning and cognitive processes are of primary aetiological significance. For the emotionally vulnerable, affective disturbances, poor coping skills, dealing with painful emotional experiences, social isolation, and low self-esteem, efficacy and image act to exacerbate the effect of the conditioning and cognitive processes. Under these circumstances, emotional escape plays a major motivational role. For the biologically-based impulsive gamblers, genetic and neurochemical factors contribute to impulsivity and need for stimulation.

Empirical evidence supporting Blaszczynski and Nower's (2002) model is emerging. For example, Ledgerwood and Petry (2006) and Stewart, Zack, Collins, Klein, and Fragopoulos (2008) reported that principal components analysis supported a three factor solution consistent with normal, emotionally vulnerable, and biologically based subgroups. However, further research is required to refine and obtain empirical data confirming the validity and reliability of subtypes within each pathway.

In summary, no single or integrated model of gambling is able to explain the causal factors responsible for the development of pathological gambling. However, integrated models taking into account the multifactorial biopsychosocial variables appear to be gaining prominence.

## **5. Reducing gambling harm**

### **5.1 Harm minimisation**

Although gambling is a socially acceptable and culturally significant pastime in Australia, the rapid expansion of gambling products and venues means greater community exposure to gaming and potential costs and harms to the consumer (Adams, Raeburn, & de Silva, 2009). Gambling harm is a community health issue (Neal, Delfabbro, & O'Neil, 2005) with an estimated 5-10 other people affected for every person with a gambling problem (Productivity Commission, 2009), necessitating interventions that reduce the potential for harm to the individual and the community.

The few community attitude studies undertaken reveal that Australians are concerned about the impact of gaming machines on their communities and do not want an expansion of their number. In contrast, most people want a reduction of gaming

machines—a view supported by 90% of Victorian adults in a 2003 study (McMillen, Marshall, Ahmed, & Wenzel, 2004). Convenient access to ATMs in gaming venues is also a community concern, reported by the Productivity Commission (1999; 2009) and surveys undertaken in Victoria (McMillen, Marshall, Ahmed, & Wenzel, 2004) and the ACT (McMillen, Marshall, & Murphy, 2004). In the ACT study, problem gamblers and their families, as well as submissions by gambling and financial counsellors, argued that convenient access to ATMs in gaming venues was a significant factor in the development and persistence of gambling problems.

Harm minimisation was introduced as a community health strategy to assist in reducing the negative consequences associated with addictive substance use behaviours and later adapted to address the negative consequences associated with harmful gambling behaviours (Blaszczynski, 2001). However, harm associated with gambling is subjective and difficult to quantify and research. Although financial, legal, intra- and inter-personal, and vocational harms are readily identifiable (Delfabbro, Osborn, Nevile, Skelt, & McMillen, 2007), the lack of an operational definition of ‘harm’ (Neal, Delfabbro, & O’Neil, 2005) means that the efficacy of implemented harm reduction strategies is difficult to evaluate. For example, AGMMA’s submission to Independent Pricing and Regulatory Tribunal of New South Wales (IPART, 2004) argued that gambling harm minimisation strategies were speculative, resulting in adverse consequences to the industry in terms of revenue, employment and entertainment value, without demonstrating positive outcomes for consumers experiencing gambling problems. IPART (2004) suggested that harm minimisation goals should incorporate the prevention and reduction of gambling problems while allowing for the continued enjoyment by consumers unaffected by gambling problems, and minimising unnecessary negative economic impacts on the gaming industry.

Although a broad range of potential strategies have been identified and discussed world-wide, few initiatives have been implemented in any consistent or organised manner (Dickson-Gillespie, Rugle, Rosenthal, & Fong, 2008). Successful implementation requires commitment and collaboration from diverse stakeholders (Delfabbro & LeCouteur, 2009) including consumers, support services and counsellors, researchers, community (including culturally and linguistically diverse groups), industry, and government (IPART, 2004; Delfabbro et al., 2007).

## **5.2 Public health perspective**

The public health perspective takes the position that prevention of health problems and reduction of harm can be more effective in maintaining community and individual well-being than individual-focussed tertiary treatment initiatives (Dickson-Gillespie et al., 2008). This perspective takes into account risk and quality of life issues for the community by addressing biological, behavioural, socioeconomic, cultural, and public policy determinants of gambling (Korn & Shaffer, 1999). Public health approaches do not require abstinence from gambling, but promote consumers' informed choice.

Korn, Gibbons and Azmier (2003) identify three goals for public health approaches: 1) to prevent gambling-related problems; 2) to promote informed attitudes, behaviours and policies regarding gambling; and 3) to protect vulnerable groups from gambling-related harm. In collaboration with other stakeholders, responsibility for developing programs to assist with these aims lies with governments and the gambling industry (Delfabbro et al., 2007). Dickson-Gillespie et al. (2008) stress the need for public health strategies that address risk and protective factors at all levels of prevention (primary, secondary and tertiary), including harm minimisation and responsible gambling approaches.

Notably, this might also include broader structural strategies regarding exposure and access to gambling activities that are most likely to result in harm, such as location of and access to electronic gaming machines (Livingstone & Adams, 2010).

### **5.2.1 Primary prevention**

Primary prevention programs are implemented at the community and individual level to prevent problems before they occur (Messerlian, Derevensky, & Gupta, 2005). The focus is on educational campaigns using electronic and print media, school programs, videos, and presentations designed to raise awareness and improve knowledge about the risks and benefits of gambling and gambling products (Williams, West, & Simpson, 2007). These campaigns may address misconceptions about luck and chance in gambling, assist in developing and enhancing a broad range of living skills including coping, social, and financial management (Gray, Oakley Browne, & Prabhu, 2007), educate about the warning signs of problem gambling, and promote gambling help services (Dickson-Gillespie et al., 2008). However, there is limited literature supporting the efficacy of these approaches in reducing the prevalence of problem gambling, with few randomised controlled studies published (Gray et al., 2007).

The design of interventions and research methodologies was critically evaluated in a review of Australian and international primary prevention interventions (Williams et al., 2007). Despite the numerous, potentially effective educational strategies described, success was reported in terms of change in knowledge, rather than change in gambling behaviour. Improvement in gambling-related knowledge was necessary but not sufficient to bring about meaningful behaviour change with regard to risk-taking in gambling. Furthermore, knowledge improvements generally were not sustained long term (Gray et al., 2007; Williams et al., 2007).

The effectiveness of the interventions has been limited by the lack of evidence-based principles informing them, with the most commonly implemented initiatives (educational campaigns) being the least effective in changing gambling behaviour, compared to more targeted secondary interventions. An evidence-based approach to developing primary prevention strategies, guided by psychological principles including the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and the Transtheoretical Model of Change (Prochaska & DiClemente, 1982) and more research to explain meaningful gambling behaviour change is warranted (Williams et al., 2007). In addition, there has been limited gambling research involving diverse populations, such as culturally and linguistically diverse groups and economically disadvantaged groups, and limited longitudinal studies examining the natural history of gambling behaviours (Korn, 2001; Rodgers, Caldwell, & Butterworth, 2009).

Notably, youth are a recommended target population for primary interventions based on the premise that gambling exposure may be initiated early within families (Dowling, Jackson, Thomas, & Frydenberg, 2010), and educational interventions have been provided to this group in various countries, although no long-term outcome studies have been reported (Gray et al., 2007; Dickson, Derevensky, & Gupta, 2004). These programs have focused on educating youth about the risks and benefits of gambling, and strategies to control future gambling behaviour (Messerlian, Derevensky, & Gupta, 2005). Schools-based primary prevention programs often include modules on understanding odds using games of chance to demonstrate (e.g., “What’s the Real Deal?”; Department of Health and Human Services, 2007), with no apparent guidance for debriefing students exposed to winning or with heightened arousal, both considered risk factors for developing gambling problems (Turchi & Derevensky, 2006). In their

detailed Framework for Action based on the Ottawa Charter for Health Promotion (World Health Organization, 1986). Messerlian et al. (2005) describe four primary prevention principles for youth gambling: *prevention* of gambling problems including strategies such as informed decision-making about participation, and development of problem solving, coping, and social skills; *de-normalisation* of underage gambling including education addressing gambling industry marketing and gambling misconceptions; *harm reduction* approaches including accurate evidence-based knowledge about the developmental needs of youth, and identification of, and treatment and support for, youth problem gambling in the community, among health professionals, and within government; and *protection* of children against potential harms associated with gambling by removing or reducing direct and indirect exposure to gambling products and promotions. Importantly, this last principle seemingly recommends against introducing young people to games of chance and possibly all gaming industry stimuli within the education system, particularly as there appears to be limited evidence supporting this approach in reducing problem gambling behaviour (e.g., Williams & Connolly, 2006).

### **5.2.2 Secondary prevention**

Secondary prevention aims to decrease the harm experienced by individuals at higher risk and the potential for harm to others participating in gambling activities (Dickson-Gillespie et al., 2008). These approaches usually take the form of policy initiatives (mandatory or voluntary) and comprise modifications to EGMs (e.g., changing reinforcement schedules, slowing rate of play, reducing size of the maximum wins), or the gambling environment (e.g., including clocks, improving lighting) to prevent development of gambling problems. Other initiatives include gaming staff training, exclusion programs, restricting access to cash for gambling, and improved awareness of and access to problem gambling support information and services. However, there is limited evidence of the efficacy of these approaches with critical evaluations suggesting that the potentially most effective interventions, involving changes to the gambling environment and gaming machines, have been ineffectively implemented (Williams et al., 2007). Some reluctance to apply effective prevention measures is attributed to conflicting interests in terms of balancing the goal of preventing and reducing harm,

with reductions in gambling revenue and potential changes in gambling as an entertainment for consumers (Adams, 2009; Williams et al., 2007).

### **5.3 Responsible gambling approaches**

Responsible gambling is a public health strategy based on harm minimisation principles where government agencies and the gambling industry have a responsibility to minimise the harm that may arise from gambling (Delfabbro et al., 2007). The philosophy directs stakeholders to develop and implement strategies that minimise harm associated with gambling which may be specified at legislative or regulatory levels and by voluntary or mandatory codes of practice administered by government and industry. A national approach to responsible gambling has been endorsed by the Council of Australian Governments (COAG), with State and Territory Governments having primary responsibility for regulation of gambling in their jurisdictions.

Inherent in the gambling industry, and particularly in relation to gaming machines, is the propensity for consumers to lose control over their purchasing decisions (Dickerson, 2003). The predominant approach to responsible gambling in venues is via provision of signs and brochures, warning consumers about problem gambling, and promoting counselling support services. If gambling is considered to be a series of purchasing decisions, being able to pre-determine the amount of money spent gambling before becoming affected by loss of control (e.g., by the use of pre-commitment cards: McDonnell-Phillips, 2006), may allow for greater enjoyment of gambling without fear of adverse consequences (Dickerson, 2003). In addition, physically removing the purchasing process from the influence of the gambling area (e.g., ensuring ATM machines are not in close proximity) provides a more effective opportunity to ensure that consumers are fully informed about the nature and consequences of gambling (Eggert, 2004), and are aware of the signs of problem gambling, thereby enhancing consumers' responsible gambling behaviour and the industry's duty of care (Dickerson, 2003).

COAG has endorsed training of gaming venue staff in responsible gambling provision and encouraged venue-based interventions for consumers (Delfabbro et al., 2007).

There is variability, however, in training requirements for employment as gaming staff in Australia but Responsible Service or Conduct of Gambling training modules include coverage of regulatory and legislative policies, understanding the nature of gambling,

problem gambling, and provision of responsible gambling, gambling exclusion processes, the identification of, and communication skills in, approaching patrons experiencing gambling problems (Delfabbro et al., 2007).

## **6. Treating problem gambling**

The absence of a unifying theory of problem gambling is reflected in the range of techniques employed in its treatment. Although the evaluation of interventions for problem gambling remains relatively limited, there is some empirical evidence for a number of interventions, including behavioural interventions, cognitive interventions, cognitive-behavioural therapy (CBT), minimal or brief interventions, motivational enhancement therapies (MET), Gamblers Anonymous (GA), inpatient rehabilitation programs, mindfulness-based therapies, couple therapies, and pharmacological interventions. Guidelines for the screening, assessment, and treatment of problem gambling are beginning to be developed (i.e., Problem Gambling Research and Treatment Centre, 2010).

The approximate overall success rates for psychological treatments have been estimated to be 70% at 6-months follow-up, 50% at 1-year follow-up, and 30% at 2-year follow-up (López Viets & Miller, 1997). A meta-analysis revealed that psychological treatments were more effective than no treatment at post-treatment (effect size = 2.01) and at follow-up evaluations (mean = 17 months) (effect size = 1.59) (Palleon, Mitsem, Kvale, Johnsen, & Molde, 2005). Although there has been improvement in the evidence base, no psychological treatment satisfies the current standards for evidence of efficacy (Westphal, 2008). Cognitive-behavioural therapies have been cautiously recommended as ‘best practice’ for the psychological treatment of problem gambling (López Viets & Miller, 1997; Westphal, 2008).

Importantly, however, recent longitudinal epidemiologic studies of non-treatment seeking adults suggest that the clinical course of problem gambling may be characterised by spontaneous remissions and natural recovery without formal intervention (Slutske, 2006).

### **6.1 Cognitive and behavioural interventions**

In accordance with learning principles, behavioural approaches have commonly applied classical and operant conditioning techniques in order to reduce the arousal and excitement associated with gambling. A substantial literature comprising predominantly case studies and small sample designs, but some randomised designs (McConaghy, Armstrong, Blaszczynski, & Allcock, 1983, 1988; McConaghy, Blaszczynski, & Frankova, 1991), has evaluated a range of behavioural procedures, including aversive techniques, covert sensitisation, positive reinforcement, exposure techniques, stimulus control techniques, systematic desensitisation, behavioural counselling, cue exposure, and imaginal desensitisation.

Cognitive formulations imply that interventions should identify cognitive distortions and biases and correct them through cognitive restructuring techniques. In addition to case study and multiple baseline designs, the exclusive use of cognitive techniques has been positively evaluated in several randomised trials using individual and group formats (Blaszczynski, MacCallum & Joukhador, 2001; Echeburúa, Baez & Fernández-Montalvo, 1996; Ladouceur et al., 2001, 2003).

Until recently, the evidence for the use of CBT relied most heavily on the outcome of case studies and multiple baseline designs. There is, however, increasing evidence of the efficacy of CBT using larger samples, controlled designs, or comparative designs. These studies have successfully applied CBT in individual outpatient settings (e.g., Dowling, Smith, & Thomas, 2006, 2007, 2009b), group settings (Blaszczynski et al., 2001; Dowling et al., 2007), combined individual and group settings (Echeburúa et al., 1996), and inpatient settings (Ladouceur et al., 2006). CBT has also been successfully applied in combination with motivation enhancement therapy (MET) (e.g., Carlbring & Smit, 2008), referral to Gamblers Anonymous meetings (Petry et al., 2006), and pharmacotherapy (Ravindran et al., 2006). An emerging literature has also successfully delivered CBT with a goal of controlled gambling (e.g., Dowling et al., 2009; Ladouceur, Lachance, & Fournier, 2009), over the Internet (Carlbring & Smit, 2008), and in self-help workbooks (e.g., Petry et al., 2006). The cognitive-behavioural techniques employed in these studies have included cognitive restructuring, alternative activity planning, problem solving training, financial planning and limit setting, social skills and communication training, relapse prevention, stimulus control, in-vivo exposure, and imaginal desensitization.

## 6.2 Minimal and brief interventions

Minimal or brief interventions are those treatments involving less professional time and/or resources than are typical of traditional therapy (Heather, 1986). They have been defined as gambling interventions that range from 10 minutes to four sessions (Petry et al., 2008). From a stepped-care perspective, these interventions may provide non-threatening, cost-effective, and time-efficient alternatives to traditional psychological interventions, particularly to those problem gamblers who have earlier onset and less severe gambling problems. Many of these interventions may also be appropriate for problem gamblers unable or unwilling to access local services and increase the accessibility of treatment for problem gamblers located in geographically remote areas.

A recent literature has successfully employed a range of interventions involving minimal therapist contact, including self-help workbooks (Hodgins, Currie, & el-Guebaly, 2001; Hodgins, Currie, el-Guebaly, & Peden, 2004; Petry et al., 2006), internet-based CBT (Carlbring & Smit, 2008), brief advice (Petry et al., 2008), MET and CBT approaches (Petry et al., 2008), information materials delivered through the mail (Hodgins, Currie, el-Guebaly, & Diskin, 2007), and behavioural interventions delivered through audiocassette (Blaszczynski, Drobny, & Steel, 2005) and videoconferencing (Oakes, Battersby, Pols, & Cromarty, 2008). Hodgins and colleagues (2001, 2004) compared the efficacy of a CBT self-help workbook, the workbook plus a telephone MET interview, and a delayed treatment waiting list control group, for 102 media-recruited problem gamblers. The 24-month follow-up evaluation of 67 participants in the active treatment conditions found that the two groups did not differ in rates of six months abstinence, but that the participants in workbook plus MET condition reported lower frequency, expenditure, and gambling severity than participants in the workbook only condition. Petry and colleagues (2008) compared the efficacy of three brief interventions (10 minute brief advice, 1-session MET, and 1-session MET plus 3-session CBT) with an assessment only control group for 180 problem gamblers. At both the six-week and nine-month follow-up evaluations, a higher proportion of participants in the brief advice group were recovered or improved compared to the assessment only group.

### **6.3 Gamblers Anonymous**

Gamblers Anonymous (GA), the parallel organisation for Alcoholics Anonymous (AA), is a voluntary fellowship that employs abstinent gamblers as counsellors. While GA is a common form of treatment, evaluative research is limited, probably due to the number of obstacles to systematic evaluation posed by the structure of GA (Stewart & Brown, 1988). In an early evaluation, Stewart and Brown concluded that GA alone does not appear to be sufficient to produce recovery for the majority of problem gamblers. More recently, studies have employed comparative designs to evaluate the efficacy of GA-oriented treatment programs, demonstrating equivalent results (Toneatto & Dragonetti, 2008). Petry et al. (2006) compared the efficacy of GA referral alone, GA referral plus CBT workbook, or GA referral plus eight sessions of individual CBT for 231 pathological gamblers. The findings revealed that the GA referral plus CBT and the GA referral plus workbook conditions reduced gambling relative to GA referral alone at the 12-month follow-up evaluation.

### **6.4 Controlled gambling interventions**

Although, historically, total abstinence has been viewed as the only legitimate and acceptable criteria of success, a substantial proportion of problem gamblers select controlled or reduced gambling as a treatment goal when it is available (e.g., Blaszczynski, Drobny, & Steel, 2005; Dowling, 2007). While the most common reason for selecting abstinence is a belief that control is not possible, the reasons for problem gamblers to select controlled gambling are that gambling retains some enjoyment, that abstinence is unrealistic or overwhelming, and that they want to successfully manage social situations involving gambling (Dowling & Smith, 2007). There appear to be few differences on demographic, gambling, and psychosocial characteristics between problem gamblers selecting abstinence and controlled gambling (Dowling, 2007; Dowling & Smith, 2007).

The viability of controlled gambling as a treatment goal is generally supported by early case studies and recent larger studies evaluating the efficacy of treatments with a goal of controlled gambling (Ladouceur, Lachance, & Fournier, 2009; Robson, Edwards, Smith, & Colman, 2002) and comparing the efficacy of treatment for problem gamblers selecting abstinence and controlled gambling as goals (Dickerson, Hinchy, & Legg England, 1990; Dowling et al., 2009b). In a preliminary evaluation of individual CBT

for 41 female pathological gamblers using intention-to-treat analyses, Dowling and colleagues (2009b) found that those selecting controlled gambling displayed comparable levels of improvement on gambling behaviour and psychological functioning indices to those selecting abstinence at the six-month follow-up evaluation. Ladouceur and colleagues (2009) evaluated the efficacy of an individual CBT intervention aiming for controlled gambling for 89 pathological gamblers using an uncontrolled open clinical trial protocol. Using intention-to-treat analyses, the findings revealed a significant reduction in the gambling and psychological outcome measures at the 12-month follow-up evaluation. Like controlled drinking, the choice of treatment goal in problem gambling appears fluid, with 66% of participants in this study shifting from the goal of controlled gambling to abstinence at least once during the intervention. At the post-treatment evaluation, more participants who retained the goal of controlled gambling gambled at least once during the preceding week than those participants who shifted from the goal of controlled gambling to finish the treatment program with a goal of abstinence.

### **6.5 Treatment of concerned significant others**

Several studies have evaluated coping skill interventions specifically designed to assist partners or “concerned significant others” (CSOs) (Hodgins, Toneatto, Makarchuk, Skinner, & Vincent, 2007; Makarchuk, Hodgins, & Peden, 2002; Rychtarik & McGillicuddy, 2006). In the largest study, Hodgins and colleagues evaluated the efficacy of a self-help workbook based on the Community Reinforcement and Family Therapy (CRAFT) model. CRAFT, which has been successfully employed with the CSOs of problem drinkers, is a CBT intervention that aims to improve CSO personal and relationship functioning, engages the problem gambler into treatment, and decrease gambling behaviour. In this study, 186 CSOs (56% spouses) were randomly allocated to a workbook only condition, a workbook plus telephone support condition, and a control condition (treatment resource information package). Findings revealed that although the conditions did not differ in terms of CSO functioning and gambling-related negative consequences, the workbook conditions produced better outcomes in terms of gambling behaviour, program satisfaction, and having needs met than the control condition.

### **6.6 Pharmacological interventions**

A substantial body of literature evaluating the efficacy of pharmacological interventions in problem gambling behaviour has recently emerged. The clinical heterogeneity of problem gambling has led to the study of a wide range of psychopharmacological agents, including antidepressants, mood stabilisers, and opioid antagonists. The pharmacological treatment literature comprises a mix of case reports, open-label studies (both participant and researcher know that participant is receiving active medication), single-blind studies (researcher but not the participant knows whether the participant is receiving active or placebo medication), and double-blind studies (neither researcher nor participant knows whether participant is receiving active or placebo medication).

A recent meta-analysis has revealed that pharmacological treatments are more effective than no treatment/placebo at post-treatment (effect size = 0.78) (Palleson et al., 2007). However, to date, no specific pharmacological agent has been found effective in at least two double-blind studies conducted by independent research teams. Moreover, there is little empirical data to guide the selection of one pharmacological intervention over another, with few differences in outcome between the main classes of pharmacological interventions. Despite the difference in post-treatment effect size in the meta-analyses conducted by Palleson and colleagues (2005, 2007), the degree to which psychological interventions are more effective than pharmacological interventions remains unclear given the use of different control conditions and outcome measures.

Selective serotonin reuptake inhibitors (SSRIs) are the most frequently investigated form of antidepressants in the treatment of problem gambling. Their use is based on the hypothesis that the serotonergic system of problem gamblers is hypoactive.

Randomised placebo-controlled trials have been employed to evaluate the efficacy of sertraline (Saiz-Ruiz et al., 2005), fluvoxamine (e.g., Hollander et al., 2000), and paroxetine (e.g., Grant et al., 2003). These studies have been confounded by high-placebo response rates and have failed to consistently demonstrate the efficacy of SSRIs in the treatment of problem gambling.

The trial of mood stabilisers/anticonvulsants in the treatment of problem gambling is based on similarity in the clinical features of problem gambling and bipolar disorder. In the only double-blind placebo-controlled randomised study of these agents, Hollander, Pallanti, Allen, Sood, and Rossi (2005) conducted a 10-week evaluation of sustained-release lithium in 40 pathological gamblers with comorbid bipolar spectrum disorder.

In this study, lithium improved gambling urges/behaviour and affective instability, but not compared to placebo.

The use of opioid antagonists in the treatment of problem gambling is based on the hypothesis that over-production of endogenous opioids contributes to problem gambling and deficits in impulse control. An 18-week trial of 77 pathological gamblers with some co-occurring Axis I disorders revealed significant improvement for naltrexone over placebo on a range of gambling-specific and global outcome measures, with low-dose naltrexone displaying comparable efficacy to higher doses (Grant, Kim, & Hartman, 2008). In response to concerns that the clinical use of naltrexone may be limited by the risk of liver damage, Grant and colleagues (2006) evaluated the efficacy of nalmefene, an opioid antagonist similar in structure and activity to naltrexone but without the dose-dependent liver toxicity. The findings of the 16-week, randomised, dose-ranging, double-blind, multicentre trial of 207 pathological gamblers revealed that nalmefene was superior to placebo across a range of illness-specific and global outcome measures. The low-dose conditions were superior to the placebo, while the higher dose condition resulted in intolerable adverse effects.

Recent double-blind research has also evaluated other pharmacological agents, such as the amino acid N-acetyl cysteine and the second generation antipsychotic olanzapine. A study randomly allocating responders from an open label trial of N-acetyl cysteine treatment to a six-week double-blind trial, found that amino acid treatment was superior to placebo in maintaining response (Grant, Kim, & Odlaug, 2007). In contrast, two olanzapine trials reported that active treatment was not superior to placebo (Fong, Kalechstein, Bernhard, Rosenthal, & Rugle, 2008; McElroy, Nelson, Welge, Kaehler, & Keck, 2008).

### **6.7 Combined psychosocial and pharmacological interventions**

Combined pharmacological and psychological intervention is considered the optimal treatment strategy for many psychiatric disorders. However, there remains a dearth of studies that evaluate the use of psychological interventions in conjunction with pharmacological interventions in the treatment of problem gambling. Ravindran and colleagues (2006) randomised 34 pathological gamblers to three treatment groups: paroxetine alone, individual CBT plus paroxetine, and individual CBT plus placebo.

Remission rates were higher for the CBT conditions than the paroxetine only group at the completion of the 16-week trial.

## **6.8 Treatment in the context of comorbidities**

The treatment of problem gambling is complicated by substantial heterogeneity in the clinical presentation of problem gamblers, which is due, in part, to a high comorbidity with other psychiatric disorders. The presence of a comorbid disorder may influence the selection of treatment and impact on the effectiveness of treatment, even when multiple disorders within the one individual are etiologically independent (Winters & Kushner, 2003). However, the presence of comorbid psychiatric disorders and their implications for treatment have received little attention.

The recognition of the psychiatric comorbidity in problem gambling and the development of subtypes (e.g., Blaszczynski & Nower, 2002; Dannon, Lowengrub, Gonopolski, Musin, & Kotler, 2006) may eventually have implications for individually tailored intervention approaches. Such a matching procedure could serve to maximize treatment response, enhance client satisfaction, reduce attrition, and lower treatment costs (Ladouceur et al., 2006). In particular, in the Blaszczynski and Nower (2002) model, clients from the behaviourally conditioned subgroup (given the absence of psychopathology) may respond well to brief interventions using psychoeducation and basic cognitive therapy designed to correct irrational beliefs (Hodgins & Holub, 2007) or home-based imaginal desensitization (Blaszczynski, Drobny, & Steel, 2005); for clients from the emotionally vulnerable subgroup, problem solving and stress-based interventions comprising more extensive cognitive-behavioural therapies may be warranted (Dowling, Smith, & Thomas, 2006, 2007, 2009b); while those in the biologically-based impulsive subgroup may require adjunct psycho-pharmacotherapy, intensive cognitive-behavioural therapy, and impulse-control strategies.

The current trend in the pharmacotherapy literature is to select a medication from a class of interventions according to the dominant presenting comorbid psychopathology (Grant & Kim, 2006). Recommendations include opioid antagonists when there is a co-occurring alcohol/substance use disorder, SSRIs when there is co-occurring depressive or anxiety symptoms, and lithium when there are comorbid symptoms of subsyndromal hypomania or mania. Several recent trials with larger samples have successfully applied such targeted interventions to subgroups of problem gamblers with co-occurring

bipolar spectrum disorders (Hollander et al., 2005), anxiety (Grant & Potenza, 2006), ADHD features (Black, 2004), and anger and substance use (Korman et al., 2008). Despite these advances, many clinical questions relating to the treatment implications of comorbid psychiatric conditions remain.

## 7. Gambling into the future

Despite its importance to Australia as a significant public health and well-being issue, our knowledge of gambling remains limited. Psychology is contributing to a growing evidence base but further development of the following areas is required. Increased focus from psychologists could substantially improve understanding in the field.

- *Understanding gambling participation*

Despite the prevalence of recreational gambling, very little research has focused on investigating gambling as an ordinary human behaviour. Longitudinal studies of developmental trends in gambling participation are required to describe its natural history, which would enable better understanding of risk and protective factors for problem gambling and the relationship between exposure and harm. The complex interplay of individual and environmental factors needs to be better understood. The lifestage of adolescence is particularly salient due to the high level of participation and potential harm at this point.

- *Agreement on the assessment of problem gambling and measurement of harm*

Agreement on what comprises problem gambling and the development of ways to operationalise gambling ‘harm’ would enable comparative studies.

- *Investigation of new aspects of gambling, particularly those enabled via global connection through the internet*

The past 10 years has seen a burgeoning of more sophisticated ways to gamble, including highly engaging electronic gaming machines and access to 24-hour gambling through the internet, mobile phone technology and interactive television platforms. Internet access poses unique problems for national regulation and regulation of access via minors. Greater understanding of the effects of exposure and access to gambling

activities, particularly those most likely to cause harm, such as electronic gaming, needs to be progressed.

- *Better evaluation of public health approaches to develop effective primary and secondary prevention*

Public health approaches to reducing gambling harm are beginning to emerge, but so far have yielded little evidence of efficacy. Effective implementation is hampered by the conflicting demands of harm minimisation and profit maximisation. Ways for industry, governments, health services, communities and patrons to collaborate to meet these multiple needs must be found, supported by appropriate evaluation of initiatives and dissemination of outcomes.

- *Improved methodology for treatment studies*

While the treatment outcome literature provides some evidence that problem gambling is amenable to intervention, the validity of such conclusions is compromised by methodological limitations (Blaszczynski, & Nower, 2007). The psychological and pharmacological treatment outcome literatures are both characterised by small sample sizes, high attrition rates, low numbers of females who are problem gamblers, and heterogeneity in forms of gambling. Many studies evaluating psychological interventions also fail to include ongoing comparative or control groups, random assignment to treatment conditions, evaluation of manualised interventions, or intention-to-treat analyses. Moreover, little attention has been paid to the impact of comorbidity on treatment response or the mechanisms of action underlying psychological interventions. The pharmacological intervention literature is characterised by a robust substantial placebo-response, where the response to pharmacological agents is often not statistically different from placebo. Many studies also tend to be confounded by short medication phase durations and a lack of double-blinding. Most pharmacological studies have homogeneous and unrepresentative samples resulting from rigorous exclusion criteria and are unable to provide information about the probability of relapse due to an absence of follow-up periods after treatment discontinuation. Longer follow-up periods and ongoing control groups are required in both literatures in order to distinguish treatment outcomes from the natural course of gambling disorders.

- *Development of guidelines for evidence-based best-practice interventions*

Dependent on further development of a robust evidence base, there is a clear need for guidelines regarding evidence-based best-practice interventions for problem gambling. Important directions for future investigation are conducting independent randomised controlled outcome trials comparing interventions, and evaluating interventions for subtypes of people who are problem gamblers so that clinicians can offer more definitive and individually tailored intervention recommendations.

- *Forensic implications*

Given the relatively high prevalence of illegal activities reported among people who are problem gamblers, clarification of issues related to volitional control, culpability and application of pathological gambling as a mitigating factor in sentencing is required, especially for those argued to have diminished control over their behaviour.

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