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The Biopsychosocial Approach to Gambling: Contextual Factors in Research and Clinical Interventions

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Abstract

Objective

This paper argues that adherence to a single, specialised theory of gambling is largely untenable. It highlights limitations of existing theories of gambling at three increasingly specific levels of analysis; namely, the social, psychological and biological.

Method

An overview of each level of analysis (social, psychological and biological) is provided by critically evaluating the contemporary literature on gambling. This is followed by discussions of the limitations and interdependence of each theoretical approach and the implications for research and clinical interventions.

Results

While several recent critiques of gambling research have provided considerable insight into the methodological limitations of many gambling studies, another problem is seldom acknowledged — the inadequacy and insular nature of many research paradigms. It is argued that gambling is a multifaceted behaviour, strongly influenced by contextual factors that cannot be encompassed by any single theoretical perspective. Such contextual factors include variations in gambling involvement and motivation across different demographic groups, the structural characteristics of activities and the developmental or temporal nature of gambling behaviour.

Conclusion

This paper suggests that research and clinical interventions are best served by a biopsychosocial approach that incorporates the best strands of contemporary psychology, biology and sociology.

Introduction

Gambling is one of the few activities that cuts across all barriers of race, class and culture. Although almost all surveys into gambling on a national level have concluded that there are more gamblers than non-gamblers (e.g., Blaszczynski, Walker, Sagris & Dickerson, 1997; Cornish, 1978; Kallick, Suits, Dielman & Hybels, 1979; Volberg & Steadman, 1992), most participants gamble infrequently. Estimates based upon survey data indicate that between 80% and 94% of British adults (Cornish, 1978), between 24% and 68% of American adults (Culleton, 1985;

Culleton & Lang, 1985; Kallick et al., 1979) and between 81% and 92% of Australian adults (Grichting, 1986; McMillen, 1995) have gambled at some time in their life.

The introduction of national lotteries, proliferation of gaming machines and construction of casinos has greatly increased the accessibility and popularity of gambling worldwide, and as a result, the number of people seeking assistance for gambling-related problems (McMillen, 1996). Therefore, it is not surprising that there has been a large increase in research into gambling, and more specifically, into the underlying mechanisms and motivations to gamble and the differences between non-gamblers, "normal" gamblers and problem gamblers. Much of this literature has been summarised in a number of recent reviews (Dickerson, 1989; Lesieur & Rosenthal, 1991; Walker, 1992; Griffiths, 1996), all of which applaud the many useful findings yielded by recent gambling research. However, what is also evident is that considerable pessimism has been expressed regarding the extent to which researchers have adequately addressed many fundamental issues of gambling. These include the factors or characteristics which distinguish normal from problem gambling, how to classify and identify problem gamblers, and the mechanisms underlying each level of gambling involvement. Although most reviewers commonly attribute the failure to address these issues to the methodological limitations of many existing studies (e.g., sample size, lack of ecological validity, poor design) and lack of clarity in the theories, concepts and arguments advanced to explain gambling.

A more serious problem is the fragmented, insular nature of research programmes. Despite token recognition of the complexity of gambling behaviour, most research has been rigidly confined to narrow areas of specialisation. Singular theoretical perspectives (e.g., behaviourism, cognitivism, addiction theory) have been assiduously pursued with few attempts to establish links or contrast them with other research programmes. This assumes that a single explanation or theory is sufficient to explain every aspect of gambling behaviour and that rival perspectives are thereby misguided. Yet, as Brown (1986) and Griffiths (1995) recently asserted, this may not be so.

Gambling is a multifaceted rather than unitary phenomenon. Consequently, many factors may come into play in various ways and at different levels of analysis (e.g., biological, social or psychological). Theories may be complementary rather than mutually exclusive, which suggests that limitations of individual theories might be overcome through the combination of ideas from different perspectives. This has often been discussed before in terms of recommendations for an "eclectic" approach to gambling (Brown, 1986) or a distinction between proximal and distal influences upon gambling (Walker, 1992). However, for the most part, such discussions have been descriptive rather than analytical, and so far, few attempts

have been made to explain why an adherence to singular perspectives is untenable. Accordingly, the aim of this paper is to highlight limitations of existing theories of gambling at three increasingly specific levels of analysis: social, psychological and biological.

Central to this view, no single level of analysis is considered sufficient to explain either the etiology or maintenance of gambling behaviour. Moreover, this view asserts that all research is context-bound and should be analysed from a combined, or biopsychosocial, perspective. Variations in the motivations and characteristics of gamblers and in gambling activities themselves mean that findings obtained in one context are unlikely to be relevant or valid in another (Dickerson, 1993, 1995). In each of the following sections, broad details of each level of analysis are provided, followed by discussions of the limitations and interdependence of each theoretical approach and the implications for research and clinical interventions. They begin with a discussion of distal factors thought to influence gambling involvement (Walker, 1992) and continue with an analysis of the limitations of theories of ongoing behaviour.

Explanations of gambling involvement

According to economic theory, gambling is considered merely another commodity, which provides utility to the consumer in the form of entertainment, excitement and the opportunity to win money (Eadington, 1995). Therefore, to determine how many people gamble in a given society it is necessary to consider the success of the gambling industry in distributing and promoting its products (Brown, 1986). Research has consistently shown a positive relationship between the availability of gambling and both regular and problem gambling (Custer, 1982; Dickerson, 1989, 1995; Dielman, 1979; Kallick-Kaufmann, 1979; McMillen, 1995; Marcum & Rowen, 1974; Skolnick, 1978; Weinstein & Deitch, 1974). Whenever new forms of gambling are introduced, or existing forms become more readily available, there is an increase in gambling, suggesting that the demand for gambling products is closely linked to their supply. The more gambling industry infrastructure that is established (e.g., new venues), the larger the range of gambling products (e.g., through the application of new technologies), and the greater the industry's marketing efforts, the more likely people will be to gamble in the first place. For example, these factors have been critical to the success of the UK National Lottery. Not only is the lottery heavily advertised on billboards, television and in national newspapers but also accessibility is so widespread that it is difficult to avoid in most shops (Griffiths, 1997). Similar trends have emerged in Australia where slot machines have been introduced in shopping malls, hotels and suburban clubs in nearly every state (McMillen, 1995).

But why is gambling so popular? According to sociologists, gambling is an inherent

component of human society (Goffman, 1967) and human beings have a natural penchant for play, risk and competition. Gambling, they argue, fits easily with cultural values, virtues and lifestyles (Abt, Smith & McGurrin, 1985), so that when gambling becomes more accessible and socially acceptable, more people will gamble. As a form of social interaction, gambling provides a means by which people can escape the boredom of everyday life, adopt new roles and enjoy the excitement of the "action"; namely, the suspense, anticipation and social reinforcement resulting from taking risks and being rewarded for one's daring (Abt & Smith, 1984).

Almost all surveys of gambling (e.g., Griffiths, 1995; Kallick-Kaufmann, 1979) have shown that these broad motivational factors are central to gambling and that attitudes towards gambling are positively related to availability and cultural acceptability. However, this perspective fails to take into account many key findings and observations in gambling research. Surveys have also shown that not everyone gambles and some people gamble more than others (e.g., pathological gamblers). Research has also shown that people often gamble for reasons other than broad social and economic reasons (Walker, 1992). These other motivations may vary according to personal characteristics of the gambler and the type of gambling activity (e.g., Chantal & Vallerand, 1996). Finally, broad social and economic theories fail to explain why certain gambling activities are more popular or "addictive" than others.

Demographic variations in gambling participation have been observed since surveys were first administered (Walker, 1992). Typically, gambling has been more popular in lower socio-economic groups (Blaszczynski et al., 1997; Crisp et al., 2000; Dickerson, Baron & O'Connor, 1994; Dickerson et al., 1996; Dickerson, Walker & Baron, 1994; Downes, Davies, Davis & Stone, 1976; Frey, 1984; Volberg & Steadman, 1992; Walker, 1992), in Catholics rather than Protestants (Grichting, 1986; Kallick-Kaufmann, 1979), among unmarried people (Lesieur, 1984; Delfabbro & Winefield, 1996; Dielman, 1979; Downes et al., 1976; Sommers, 1988), in younger age groups (Mok & Hraba, 1991; Griffiths, 1995; Morgan Research, 1997) and in men (Abbott & Volberg, 1996; Dickerson et al., 1996; Mark & Lesieur, 1992; Volberg & Steadman, 1992). In addition, there are significant demographic variations in gambling activities. Older people and women are significantly less likely than younger men to gamble on (and develop problems with) casino games and racing activities (Hraba & Lee, 1995; Mok & Hraba, 1991), but they are just as likely to gamble on lotteries and slot machines. On the other hand, lottery participation is higher in lower socio-economic groups and in older and middle-aged people (Delfabbro & Winefield, 1996; Dickerson, Walker et al., 1994; Dickerson, 1995). These variations suggest that overall increases in gambling participation (and the incidence of gambling-related problems) are not evenly distributed across demographic groups. Not all gambling activities are

accessible or appealing to certain groups.

Consistent with trends observed in overall participation rates, Australian research (e.g., Blaszczynski et al., 1997; Crisp et al., 2000; Delfabbro & Winefield, 1996; Dickerson, Baron et al., 1994; Dickerson, Walker et al., 1994; Dickerson et al., 1996) has found that the incidence of gambling-related problems is considerably higher in lower socio-economic groups and in younger people, and it is more likely to be associated with slot machines, one of the few activities which attract similar numbers of men and women. Accordingly, understanding demographic variations in overall participation is vital if one is to estimate the likely social effects of expansion or product changes in existing gambling markets. For example, in the future, Internet gambling and new sports betting facilities are likely to attract relatively more younger men, whereas an increase in slot machines or lotteries will have a significant effect upon the number of women gambling (Griffiths, 1999a). These variations exist because not all people hold the same attitudes towards gambling nor do they have the same motivations for gambling. For example, Protestants are more likely than Catholics to regard gambling as a waste of money (Grichting, 1986), whereas people in lower socio-economic groups (regardless of religious background) are more apt to view gambling positively as a way of escaping from the drudgery of uninteresting, routine work and a way to elevate one's living standards (Furnham & Lewis, 1986). By contrast, older people gamble less than younger people; they are less concerned with elevating their position in society (Mok & Hraba, 1991) and more interested in the opportunities for socialisation and relaxation that gambling provides (Morgan Research, 1997).

Variations in gambling preferences are thought to result from both differences in accessibility and motivation. Older people tend to choose activities that minimise the need for complex decision-making or concentration (e.g., bingo, slot machines), whereas gender differences have been attributed to a number of factors, including variations in sex-role socialisation (Abt & Smith, 1984), cultural differences (Walker, 1992) and theories of motivation (Delfabbro, 2000). Specifically, the underrepresentation of women in casino games, racing and sports betting has been explained in terms of the long association between these activities and male subcultures; for example, boys' childhood and adolescent games and male gambling venues. Alternatively, as suggested by recent Australian research, it may be that women have different motivations for gambling (Loughnan, Pierce & Sagris, 1997); namely, a greater desire for relaxation and escape from worries (Crisp et al., 2000). Research by Chantal and Vallerand (1996) suggests that such motivations are more likely to be satisfied by participation in chance activities, such as lotteries, rather than more skilled activities, such as racing.

Variations in motivation are also frequently observed among people who participate in the same gambling activity (Dickerson, Walker, Legg England & Hinchy, 1990;

Dumont & Ladouceur, 1990; Fabian, 1995; Griffiths, 1993). For example, slot machine and video poker players may gamble to win money, for enjoyment and excitement, to socialise and to escape negative feelings (Dumont & Ladouceur, 1990; Griffiths, 1995). Some people gamble for one reason only, whereas others gamble for a variety of reasons (e.g., Lesieur, 1984; Moran, 1970). A further complexity is that people's motivations for gambling have a strong temporal dimension; that is, they do not remain stable over time. As people progress from social to regular and finally to excessive gambling, there are often significant changes in their reasons for gambling. Whereas a person might have initially gambled to obtain enjoyment, excitement and socialisation, the progression to problem gambling is almost always accompanied by an increased preoccupation with winning money and chasing losses (Lesieur, 1984).

The importance of the structural characteristics of activities

Another factor central to understanding gambling behaviour is the structure of gambling activities. As shown by Weinstein and Deitch (1974) and Griffiths (1993), gambling activities vary considerably in their structural characteristics, including the probability of winning, the amount of gambler involvement, the amount of skill that can be applied, the length of the interval between stake and outcome and the magnitude of potential winnings. Structural variations are also observed within certain classes of activities such as slot machines, where differences in reinforcement frequency, colours, sound effects and machines' features can influence the profitability and attractiveness of machines significantly (Griffiths, 1993). Each of these structural features may (and almost certainly does) have implications for gamblers' motivations and the potential “addictiveness” of gambling activities.

For example, skilful activities that offer players the opportunity to use complex systems, study the odds and apply skill and concentration appeal to many gamblers because their actions can influence the outcomes. Such characteristics attract people who enjoy a challenge when gambling. They may also contribute to excessive gambling if people overestimate the effectiveness of their gambling systems and strategies (see discussion of cognitive theories below). Chantal and Vallerand (1996) have argued that people who gamble on these activities (e.g., racing punters) tend to be more intrinsically motivated than lottery gamblers in that they gamble for self-determination (i.e. to display their competence and to improve their performance).

People who gamble on chance activities, such as lotteries, usually do so for external reasons (i.e. to win money or escape from problems). This was confirmed by Loughman et al. (1996) in a clinical survey of problem gamblers wherein racing

punters emphasised the importance of skill and control considerably more than slot machine players. Although many slot machine players also overestimate the amount of skill involved in their gambling (e.g., Walker, 1992), other motivational factors (such as the desire to escape worries or to relax) tend to predominate (Walker, 1985). Thus, excessive gambling on slot machines may be more likely to result from people becoming conditioned to the tranquilising effect brought about by playing rather than just the pursuit of money. On the other hand, racing punters tend to be more likely to gamble for excitement (Blaszczynski, McConaghy & Winter, 1986). This has important implications for the psychological study of ongoing gambling behaviour.

Another vital structural characteristic of gambling is the continuity of the activity; namely, the length of the interval between stake and outcome. In nearly all studies, it has been found that continuous activities (e.g., racing, slot machines, casino games) with a more rapid play-rate are more likely to be associated with gambling problems (Dickerson, 1989; Dickerson, 1995; Dickerson et al., 1996; Griffiths, 1995; Walker, 1992; Walker & Dickerson, 1996). The ability to make repeated stakes in short time intervals increases the amount of money which can be lost and also increases the likelihood that gamblers will be unable to control spending (O'Connor, Dickerson & Phillips, 1995). Such problems are rarely observed in non-continuous activities, such as lotteries, in which gambling is undertaken less frequently and where outcomes are often unknown for days. Consequently, it is important to recognise that the overall social and economic impact of expansion of the gambling industry will be considerably greater if the expanded activities are continuous rather than non-continuous.

Theories of gambling behaviour

Although sociological, situational and demographic factors can explain why some people are more likely to gamble than others, these theories cannot explain why some people gamble more than others or what factors contribute to behaviour maintenance in gambling. Psychological theories become important at this level. Research in this area is remarkably diverse. Almost every major branch of psychology (e.g., cognitivism, behaviourism, Freudian theory, addiction theory), has been utilised in an attempt to understand gambling. Despite this, it is possible to distinguish two broad, general perspectives: first, theories that attribute ongoing behaviour and excessive gambling to habitual processes which are the consequences of gambling; second, theories that state that variations in behaviour result from variations in the characteristics, or “make-up,” of individual gamblers. In other words, whereas the first places a stronger emphasis upon psychological determinants of gambling, the second emphasises biological differences between individuals.

Central to psychological explanations is the idea that every person who gambles has the potential to become a problem gambler. This is because gambling activities are difficult to resist by their very nature: excitement, risk-taking and the possibility of monetary gains. The more a person gambles, the more difficult it becomes to resist the temptation to commence a gambling session or stop once gambling has commenced (Dickerson, 1989). Accordingly, it has been suggested that there is no neat distinction between problem gambling and normal gambling; rather there is a continuum from social gambling to “regular” gambling to problem gambling.

People who gamble regularly may display many of the same behaviours as people with gambling problems, although to a lesser degree. This view gives rise to conceptualisations of problem gambling that emphasise the developmental and habitual nature of problem gambling behaviour rather than individual pathology. This perspective avoids terms such compulsive, addiction or pathology in preference for terms such as impaired control (O'Connor et al., 1995). Although researchers' views differ concerning the psychological mechanisms behind loss of control, three general classes of theory will be used to illustrate the limitations of psychological accounts. They are behaviourist theories that explain persistent gambling as a conditioned process; need-state models that see gambling as a form of psychological or physiological dependence; and cognitive theories that attribute excessive gambling to erroneous beliefs about the potential profitability of gambling.

Behaviourist Approaches

Both classical and operant conditioning principles have been applied to the study of gambling. In operant explanations for problem gambling (e.g., Delfabbro & Winefield, 1999a, 1999b; Dickerson, Hinchy, Legg England, Fabre & Cunningham, 1992), persistent gambling is seen as a conditioned behaviour maintained by intermittent schedules of reinforcement, most likely a variable-ratio schedule. This involves the provision of infrequent rewards after varying numbers of responses. On the other hand, proponents of classical conditioning models (e.g., Anderson & Brown, 1984) argue that people continue to gamble as a result of becoming conditioned to the excitement or arousal associated with gambling, so that they feel bored, unstimulated and restless when they are not gambling. Both the classical and operant perspectives have been central to the development of measures of “impaired control” over gambling (Baron, Dickerson & Blaszczynski, 1995) and clinical interventions using desensitization, aversive conditioning and satiation techniques (see Griffiths, 1995, for a review). In each of these examples, it is assumed that the more a person gambles, the more his or her behaviour is dictated by factors beyond the person's control.

Despite evidence supporting both theories (see Griffiths, 1995; Walker, 1992),

neither is entirely satisfactory on its own. Classical conditioning theory seems useful to explain people's motivation to commence a gambling session, but appears less useful to explain persistent gambling behaviour. Conversely, while operant conditioning might explain ongoing behaviour, it appears less useful in explaining why people commence gambling or recommence gambling after a prolonged period of abstinence (Walker, 1992). Researchers have also raised questions about the extent to which gambling behaviour adheres to operant theory at all, since gamblers lose more than they win and because reinforcement magnitudes are not independent of player responses, e.g., stake sizes (Delfabbro & Winefield, 1999a; Griffiths, 1999b). Nevertheless, the importance of subtle variations in machine characteristics upon behaviour (Griffiths, 1993) reinforces the role of operant conditioning in the maintenance of behaviour, although perhaps in more subtle ways than was envisaged.

It is important to recognise that these theories cannot stand in isolation. As with other psychological theories, conditioning theories cannot explain why people exposed to similar stimuli respond differently; why some gamble whereas others do not or why some people gamble more than others. In addition, the effectiveness, or strength of the conditioning effect may be a function of motivational factors and type of activity. Some, but not all, people gamble for excitement or relaxation, and as discussed above, people satisfy these needs by different activities (Blaszczynski, McConaghy et al., 1986). Thus, it is unlikely that classical conditioning will affect all types of gambling or gamblers. Similar difficulties plague attempts to develop general operant theories of gambling. Some activities appear to suit this form of explanation more than others. Examples include slot machines and scratch tickets where there is a short time interval between stake and outcome, and where outcomes are entirely determined by chance. It seems more difficult to apply these principles to skilled gambling games such as blackjack, poker and sports betting, where player decisions can significantly influence outcomes.

Need-State Models and Theories of Addiction

Much of the discussion relating to classical conditioning also applies to need-state theories of gambling, which assume that people gamble to escape unpleasant feeling states such as anxiety, depression and boredom. These perspectives have been applied to all facets of gambling, including involvement, ongoing behaviour and excessive gambling. They are incorporated into the DSM-IV classification for pathological gambling (i.e. gambled as a way of escaping from problems or intolerable feeling states). Although not all researchers agree that these motivations signify the existence of a physiological addiction (Walker, 1989), most agree that people can become psychologically addicted to gambling.

The concept of arousal has been studied most extensively (e.g., Anderson &

Brown, 1984, 1987; Brown, 1986; Dickerson et al., 1992; Griffiths, 1995) but results have not been consistent. Arousal increases have been observed in some studies, but not in others (see Griffiths, 1995, for a review), and most increases have been relatively small. Variations in arousal have neither co-varied reliably with the persistence of behaviour (Dickerson et al., 1992) nor the onset of gambling sessions. Furthermore, Walker (1992) questioned the explanatory value of arousal theories arguing that the excitement of gambling is unlikely to be independent of people's desire to win money.

Similar problems have plagued attempts to associate gambling with anxiety and depression. While a considerable number of studies (e.g., Bergler, 1957; Blaszczynski & McConaghy, 1989; Blaszczynski, McConaghy & Frankova, 1990; Dickerson, Cunningham, Legg England & Hinchy, 1991; 1992; Greenson, 1947; McCormick, Russo, Ramirez & Taber, 1984; Moran, 1970) have revealed that negative mood states commonly accompany gambling or predict the duration of gambling sessions (Dickerson et al., 1991), most analyses have been confined to problem gamblers and high-frequency gamblers. For this reason, it is unclear whether these mood states are also associated with less frequent gambling. Moreover, it is not possible to determine whether mood states precede or arise as a consequence of gambling. Indeed, as Walker (1992) points out, it may be that gamblers become depressed as a result of losing more money than they can afford.

Again, the temporal dimension suggests that the role of mood states is unlikely to be independent of the gambler's characteristics. As with arousal, it is unlikely that avoidance of negative feeling states will be common to all activities or all gamblers. Blaszczynski, McConaghy et al. (1986) suggested that some activities satisfy these needs more than others; for example, slot machines appear to reduce anxiety, whereas racing provides arousal and excitement. In addition, variations in gambling motivation among participants involved in the same activity suggest that not all people gamble to satisfy unfulfilled needs. It is also unclear why some people apparently have a greater need for arousal or relaxation than others, and whether this would be sufficient to explain differences between normal and excessive gambling? As suggested by McCormick et al. (1984), it is important to place behaviour in a social context to understand how gambling compensates for, or assuages, problems or deficits experienced in other areas of life. Alternatively, as will be suggested later in this paper, it may be useful to look for dispositional or biological differences to explain the varying motivations and behaviour of individual gamblers.

Cognitive Theories

Despite the fact that the odds of almost all activities are weighted strongly in favour of the house, gamblers continue to believe they can win money from gambling

(Walker, 1992). This observation leads to the conclusion that gambling may be maintained by irrational or erroneous beliefs. For example, people overestimate the extent to which they can predict or influence gambling outcomes and tend to misjudge how much money they have won or lost. This hypothesis has been confirmed in numerous studies (e.g., Langer, 1975; Langer & Roth, 1983) showing that people overestimate the degree of skill or control which can be exerted in chance activities, and also, studies using the so-called “thinking aloud” method (see Gaboury & Ladouceur, 1988), which reveal high levels of irrationality in verbalised statements made during gambling sessions. These findings have been confirmed not only under laboratory conditions (e.g., roulette: Gaboury & Ladouceur, 1988; Ladouceur & Gaboury, 1988; Ladouceur, Gaboury, Dumont & Rochette, 1988) but also in ecologically valid gambling settings, using “regular” gamblers (video poker: Ladouceur, Gaboury, Bujold, Lachance & Tremblay, 1991) and in various countries (e.g., slot machines in the United Kingdom: Griffiths, 1994a; slot machines in Australia: Walker, 1992).

Based upon these findings, it has been suggested that irrational thinking may be related to problematic gambling behaviour (Ladouceur & Walker, 1996; Wagenaar, 1988), with persistent behaviour thought to be the result of people's overconfidence in their ability to win money (Griffiths, 1994a; Wagenaar, 1988; Walker, 1992). Evidence suggests that problem gamblers frequently overestimate the amount of control and skill involved in gambling (Loughnan et al., 1997). Unfortunately, these observations have also been made using students with no gambling experience (e.g., Ladouceur et al., 1988, 1991) indicating that irrational beliefs are not positively related to level of gambling involvement. A further problem is that irrationality does not appear to co-vary with other observable facets of gambling; for example, the level of risk-taking (Ladouceur & Gaboury, 1988) or reinforcement frequency (Ladouceur et al., 1988). Alternatively, where irrationality positively relates to involvement, few differences in behaviour have been observed. Consequently, Dickerson and Baron (2000) have concluded that irrational thinking is probably more a reflection of demand characteristics than a rational underlying behaviour. A lot of what people say may only result from the difficulty of trying to come up with rational, meaningful statements in chance-determined situations.

In additional to these conceptual difficulties, it is also possible that contextual factors play a role in cognitive research. For example, Griffiths (1994a) found that regular players had greater difficulty than occasional players in verbalising their thoughts while they were gambling. Regular players seemed capable of gambling without attending to what they were doing, suggesting: (a) that cognitive processes did not play a major role in the maintenance of their behaviour, or (b) that the original justifications or rationales for behaviour were less accessible. In either case, Griffiths' observations suggested that temporal factors (namely, how long a person has been gambling) appear to be important. Therefore, all other things

being equal, it appears that valid comparisons cannot be drawn between gamblers with differing levels of gambling experience; for what holds for infrequent gamblers might not hold for regular players, and vice versa.

Similar problems arise when combining samples of people who may or may not have similar motivations for gambling. Cognitive approaches assume that people overestimate their chances of winning because obtaining money is an important motivation for their gambling. However, as is clear from the previous discussion, not all people gamble for this reason. Moreover, as shown by Burger and Cooper (1979) and Burger and Smith (1985), the way in which people respond to or interpret gambling tasks may vary according to their level of control motivation. People who for whatever reason, are more motivated to seek control in their lives appear more prone to overestimate the extent to which they can influence the outcomes of chance-determined activities. Accordingly, variations in control motivation in cognitive studies of gambling would be an additional, and uncontrolled source of within-sample variation, which could influence the reliability of the statistical effects observed.

Finally, it is again important to observe that cognitive theories need to take structural variations in activities into account. Many cognitive processes thought to underlie gambling behaviour (e.g., overestimations of control, biased attributions) are more likely to be observed when activities are perceived as having some skill component (Langer, 1975). With some activities, there is a genuine possibility for skilful play (e.g., racing, blackjack, table poker). The more people play or know about these activities, the greater their awareness of the skills involved. Thus, beliefs about control and skill are neither completely irrational nor consistent across players. Instead, in these situations, researchers must examine the quality of play; for example, to what extent the person adheres to optimal strategies, rather than look for evidence of irrational thinking (e.g., Keren & Wagenaar, 1985).

Even in activities where outcomes are chance-determined, there are likely to be variations in the extent to which gamblers' perceive that the outcomes are solely chance-determined (e.g., roulette and craps are probably more likely to be perceived as skilful than Australian slot machines because of the greater complexity of the rules and the possibility for variations in playing strategy). Therefore, it may be ineffective to compare results across studies using different chance activities without controlling for variations in perceived skill.

Biological and Dispositional Theories

Social and psychological explanations are insufficient to explain the full complexity of gambling behaviour. Whether ongoing behaviour is explained in terms of behaviourism, need-state models or cognitive theories, it remains unclear why one person gambles more heavily than another. In other words, while it seems likely

that increased involvement with gambling is likely to contribute to loss of control over behaviour, development of irrational beliefs and greater psychological dependence, it is important to determine what makes some gamblers more susceptible to these factors than others. It is here that research into biological and personality factors becomes important. Central to this research is to ascertain whether pathological gamblers possess qualities which would predispose them to excessive gambling. Much of this literature was summarised by Walker (1992), so this discussion is confined to three research areas: whether problem gamblers are particularly disposed towards developing an addiction; whether they have a greater need for arousal; and whether gamblers are naturally more impulsive than non-gamblers.

Studies into the first question have been undertaken by examining overlaps between potentially addictive and problematic behaviours with alcohol, illicit drugs and gambling. This includes research into problem gamblers with psychoactive substance abuse problems (e.g., Ramirez, McCormick, Russo & Taber, 1984; Linden, Pope & Jonas, 1986; Ciarrocchi & Richardson, 1989) or those who also have drug or alcohol use problems, or both (e.g., Lesieur, Blume & Zoppa, 1986; Lesieur & Heineman, 1988; Griffiths, 1994b, 1994c). The incidence of cross-addictions in populations of pathological gamblers has been cited as evidence for the existence of an addictive personality type (Blaszczynski, 1996). In addition, research by Comings et al. (1996), for example, has suggested a genetic basis for gambling in some people. They reported that a variant of the dopamine D2 receptor gene (DRD2), which has been associated with other addictions, including alcoholism, was found in 51% of pathological gamblers compared with only 26% of controls. The effect of this gene was more closely associated with pathological gambling than any other addiction. This suggested that the genetic variants of the DRD2 gene may play a significant role in pathological gambling, which supports the concept that variants in this gene are an important risk factor for addictive behaviours.

Although intriguing, such evidence does not provide convincing evidence for the existence of a biological basis for gambling addiction. For a start, many pathological gamblers do not have other addictions (Blaszczynski, 1996). Moreover, as Comings et al. (1996) show, only half of the problem gamblers possessed the so-called “gambling gene,” suggesting that this gene is not a necessary factor in the etiology of gambling addiction. Finally, researchers (e.g., Blaszczynski, 1996; Walker, 1989) have questioned the notion of physiological addiction altogether, arguing that there is very little evidence to support the applicability of traditional addiction models to gambling. Gamblers rarely experience cravings, withdrawal symptoms or tolerance in the traditional addictions sense, suggesting that excessive gambling is more likely to arise as a result of other processes. If the term “addiction” is to be used at all, it is better used in a

general sense to denote a condition broadly characterised as a repetitive and uncontrollable behaviour that has undesirable consequences for individuals and those around them (Griffiths, 1995).

Secondly, attempts have been made to associate gambling with an excessive desire for arousal or risk-taking. For example, Brown (1986) has hypothesised that pathological gamblers are habitually underaroused or understimulated and need gambling to reach an optimal level of arousal. However, the available evidence offers little support for this notion. While studies by Wolfgang (1988) and Anderson and Brown (1984) have shown that regular gamblers tend to score higher on measures of sensation-seeking than controls, other studies have failed to find any associations at all (Allcock & Grace, 1988; Ladouceur & Mayrand, 1986), or paradoxically, studies have found that problem gamblers tend to score lower than population norms on the sensation-seeking scale (Blaszczynski, Wilson & McConaghy, 1986; Blaszczynski et al., 1990; Dickerson, Hinchy & Fabre, 1987). This has been attributed to the fact that problem gamblers tend to engage in a very limited range of activities compared with other people, which limits the number of items endorsed (their scores) on the sensation-seeking scales. Consequently, it seems unlikely that this variable provides a reliable basis for distinguishing problem gamblers from other gamblers.

Thirdly, researchers have tried to associate excessive gambling with the inability to control impulses. This notion was central to the development of the first psychiatric definition of gambling in the DSM-III (American Psychiatric Association, 1980), which classified pathological gambling as a form of impulse disorder, not unlike compulsive stealing (kleptomania) and hair-pulling (trichotillimania). Gamblers were hypothesised to have experiences characteristic of other recognised impulse disorders, such as, physical and psychological tension prior to the commencement of gambling and to experience a strong sense of pleasure or release once the activity had commenced (McGurrin, 1992). Implicit in this explanation was the idea that gambling was unplanned, or involuntary, and highly repetitive.

Despite the inconsistency of psychometric evidence on this topic (Allcock & Grace, 1986), clinical observations suggest that a loss of control is common to problem gambling (Blaszczynski & McConaghy, 1989; Carlton & Manowitz, 1987; McCormick, 1994;). Researchers have argued that there are similarities between problem gambling and children with attention deficit disorder (ADD) (Goldstein, Manowitz, Nora, Swartzburg & Carlton, 1985), in that both are characterised by limited attention spans, impulsive behaviour, inability to delay gratification and insensitivity to punishment. Carlton et al. (1988) confirmed this by administering a modified ADD scale to a sample of 16 problem gamblers and found that they scored significantly higher on ADD items than a control group. This suggested the possibility that ADD during childhood may be an antecedent to the development of

gambling problems in adulthood. Recent psychobiological evidence suggests that such traits can be directly linked to deficiencies in the production of certain neurotransmitters thought to be associated with impulse control. One of these substances is serotonin (5-hydroxtryptamine: 5-HT), which has an inhibitory effect upon the cortex and is associated with more controlled behaviour (McGurrin, 1992). It has been found that decreased 5-HT levels are associated with heavy alcohol consumption (Branchy, Shaw & Leiber, 1981), whereas higher levels increase the likely effectiveness of alcohol treatment programmes (Naranjo, Sellers & Lawrin, 1986). McGurrin (1992) and Griffiths (1995) have argued that this substance may also play a role in the development of problem gambling.

The question that remains, however, is how researchers will ascertain the direction of causality; namely, whether decreased 5-HT levels are the result, or cause, of excessive gambling. This problem extends to all attempts to draw associations between dispositions and gambling behaviour. This indicates the importance of a temporal dimension in gambling. Since gambling is likely to influence the characteristics of gamblers, it may be unwise to assume that observations of one sample can be generalised to other samples of gamblers with different levels of gambling experience.

Physiological accounts assume that such factors should override other environmental or contextual factors and allow for the development of a general theory of gambling addiction. However, this is clearly not so. Apart from the conceptual difficulties associated with determining a causal relationship between characteristics and behaviour, these theories are unable to account for the full diversity of gambling patterns and behaviour. They fail to explain demographic differences in the preference for activities and variations in motivation. Neither can they explain why some activities are more “addictive” than others and why the structural characteristics of specific activities (e.g., slot machines) can influence behaviour. Therefore, it appears that excessive gambling is likely to result from both dispositional and psychological factors and the complex interaction between them. Psychological explanations must play a role because of the obvious importance of external factors (e.g., environmental and situational variables) in the development of gambling habits. However, it is also clear that internal factors influence how certain individuals respond to these situations. The implications of this observation for the study and treatment of problem gambling are discussed below.

Conclusions and Implications for Research and Interventions

In summary, it seems that gamblers are first influenced by sociological factors; for example, the availability of gambling opportunities, attitudes and habits of parents,

friends and peer groups as well as a lack of alternative activities. During the middle stages of development, there are many factors which heavily influence the maintenance of gambling behaviour. Three of these factors are schedules of reinforcement, the “escape” qualities of gambling and cognitive biases, all of which have been summarised in this paper. While it remains unclear exactly how some people come to gamble excessively, it is agreed that persistent gambling eventually leads to a desperate “spiral of options” (Lesieur, 1984) where gambling is largely maintained by the desire to win money, recover losses and pay back debts. Gambling is thus a complex, multidimensional activity that is unlikely to be explained by any single theory. Instead, this research is best served by a biopsychosocial model that stresses the individual and idiosyncratic nature of the development of gambling problems and emphasises the role of contextual factors internal and external to the process of gambling itself.

Recognition of this complexity has important implications for gambling research both in terms of the selection of samples and data analysis. Firstly, the existence of structural variations in activities suggests that results obtained using one activity cannot be generalised to other activities that are not structurally equivalent. Existing research suggests that continuity and the element of skill involved are two factors that must be similar in order for valid comparisons to be made. Secondly, studies of gambling motivation are unlikely to be valid unless both individual and situational factors are taken into account. Since motivations differ across demographic groups (e.g., different genders and ages), across activities and over time, studies must ensure that these factors are controlled before drawing conclusions. Samples should contain equal numbers of men and women of a similar age with similar levels of gambling experience. Alternatively, in situations where this cannot be achieved, gender, age and experience should be used as co-variants, or as the first variables in regression analyses.

Thirdly, in recognition that personality may influence the strength of experimental effects, it is important that researchers match comparison groups in terms of these variables. For example, cognitive experiments investigating the illusion of control should include measures of “desirability for control” (Burger & Cooper, 1979), whereas arousal experiments should include measures of gambling motivation. In addition, researchers should not assume that biological differences or psychological factors will explain all gambling behaviour. Instead, it may be useful to explore the interaction between these different levels of analysis; for example, by examining whether variations in the structural characteristics of activities (e.g., reinforcement frequency) affect people with, or without, the characteristic under observation.

Implications for Prevention, Intervention and Treatment

Since sociological factors appear to be critical in the acquisition of gambling

behaviour, prevention needs to be aimed at the social and situational antecedents. This can be approached from a number of levels (e.g., societal, school, family, individual, etc.), some of which may be more practical than others. Since problem gamblers start gambling at a significantly earlier age than non-pathological gamblers, an obvious step would be for governments to legislate against young people gambling (i.e. below 18 years of age). A “blanket ban” on gambling would, in most cases, reduce acquisition until at least late adolescence. Both parents and peers may model gambling; therefore, the family's role in maintaining gambling behaviour should be addressed in therapy and prevention plans should aim to increase the gambler's contact with non-gambling peers. Also, evidence or knowledge of a gambler's own negative thoughts or feelings about gambling behaviour, and irrational biases may provide useful cues for behaviour modification (Stumphauzer, 1980).

These findings have led to suggestions to enhance educational awareness of the dangers of gambling not only amongst children and adolescents but also parents, guardians and teachers. Although recommendations of this nature have typically tended to focus upon the need for greater awareness of the “true” odds and the unprofitability of gambling, we believe that this approach needs to be applied with caution. It is quite possible for education to have the opposite effect; namely, to increase students' knowledge of how to gamble. In addition, it is questionable whether knowing the true odds has a significant effect upon dissuading people from gambling, given that many problems gamblers are well educated and have, in some cases, some knowledge of basic mathematics. For many, the belief that they are inherently lucky or different from others helps maintain their interest in gambling. Accordingly, educational campaigns that focus upon the negative consequences of gambling and alternatives to it may have greater success. While these sorts of campaigns are unlikely to prevent gambling in all young people, they might reduce (a) the total number of adolescents who start to gamble and (b) the amount of time an adolescent spends gambling.

The fact that some gamblers are socially rewarded for gambling cannot be altered directly, but more adaptive personal and social skills can be taught as responses to stress (i.e. emotional antecedents); for example, relaxation, assertion and social skills training (Stumphauzer, 1980). Alternatively, where people seek the company of other gamblers as a way to escape from unpleasant feeling states or life stress, the development of alternative interests, hobbies and social networks should be afforded priority during intervention. This approach could also be extended to people who gamble alone. An essential aspect of treatments should be to identify and address the factors that are antecedents to gambling, those that provide the underlying motivation and social and cultural context in which the behaviour has developed. Only when these are addressed can treatments be extended to more specific psychological aspects of the behaviour itself. This is because these

broader social and structural factors influence a person's exposure to gambling, their opportunities to gamble and their ability to recover. Detailed analysis of the person's daily schedule and the nature and extent of available social supports is essential during this phase of treatment.

Viewing problem gambling as a biopsychosocial process recognises the diversity of psychological factors involved in maintaining the behaviour as well as the fact that problem gamblers are not a homogeneous group; in fact, there appear to be a number of subtypes. This has major treatment implications. For instance, Griffiths (1995) outlined two very different types of gamblers. The first type appeared to be addicted to gambling itself and played to test skill, gain social rewards and mostly, for excitement (i.e. the “buzz” or “high”). This was termed a “primary addiction” and appears to be a mixture of Moran's (1970) “subcultural” and “impulsive” types of gamblers. Identifying the environmental, situational or emotional factors that precede a gambling session would be next stage in the intervention. The use of imaginal desensitization, counterconditioning and situational exposure are methods, which have been used to teach people to resist the urge to gamble. Of course, therapists differ in their view concerning the factors underlying this urge. Whereas some emphasise the learned or conditional quality of the behaviour and emphasise the role of stimulus-control, others may emphasise irrational beliefs or the person's desire to obtain physiological stimulation from the activity.

Furthermore, as emphasized by Griffiths (1995), a second type of gambler may gamble for the reasons described earlier, such as escape. These gamblers are usually depressed and socially isolated, and could be described as having a “secondary addiction” in that the player uses gambling as an escape from a primary problem (e.g., broken home, relationship crisis, etc.). It seems that this type of “escape gambler” is not confined to the United Kingdom. This type appears to be a mixture of Moran's (1970) “neurotic” and “symptomatic” types. If the primary problem is resolved by excessive gambling, then playing should disappear. This distinction obviously has clinical usefulness and may also help explain conflicting research, some of which states that gambling is a social activity and some of which states that it is a solitary activity. As discussed above, such gamblers are likely to benefit from any intervention that tries to find alternative activities that take the place of gambling.

Conclusions

Examining gambling and problem gambling as a biopsychosocial behaviour makes it evident that individual differences and broader contextual factors must be considered and not ignored. This paper provides evidence that a narrow focus upon one theoretical perspective in research and clinical interventions may, in many cases, not be justified. Such an approach fails to consider the

interrelationships between different levels of analysis. It would be of limited value to many gamblers whose problems have a different etiology, which may be multifaceted. As Gambino and Shaffer (1979) pointed out over two decades ago, individuals are self-determining agents, and therefore, a taxonomy of situations must be developed to describe the vast majority of contexts and conditions in which people use substances or engage in habitual behaviours to alter their perceived experience.

They also make the important point that these behaviours are not completely self-developed or understood by the people themselves and should be examined more broadly. This is because, gambling becomes a habitual behaviour. Since the perceived experience of the individual can change over time, it is possible that focusing upon the self-reported factors currently maintaining the behaviour does not provide insights into the factors that led to the behaviour developing. Thus, when one takes a biopsychosocial view, it becomes possible to perceive the individual gambling in terms of its broader social and cultural context. This approach also suggests that different perspectives and approaches may be beneficial, so long as they appear to apply to the particular gambler concerned. Moreover, it indicates that a variety of treatments could be beneficial simultaneously.

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