Chapter 21
Gambling

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Introduction

For most people, gambling is an enjoyable and harmless activity. However, for a small minority, gambling can become both addictive and problematic.[1] *Pathological gambling* appears in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*) in the category "impulse control disorder not elsewhere classified" along with other disorders such as kleptomania or pyromania (American Psychiatric Association, 1994). Generally, pathological gambling can be described as a persistent and recurrent maladaptive gambling behavior that disrupts personal, family, or vocational pursuits. The *DSM-IV* criteria highlight loss of control, withdrawal symptoms, tolerance as well as relapse and suggest a strong similarity to substance abuse disorders, although unique (gambling-specific) characteristics are also evident (e.g., chasing).

Due to the increase in accessibility and opportunities to gamble, a large body of research has shown that increasing numbers of adolescents engage in gambling (e.g., Griffiths, 1995; Jacobs, 2000). Surveys in the United States reveal that participation in card games, sports betting, games of skills, and video lottery terminals are most common in youth (e.g., National Research Council, 1999). In order to determine the extent of problem gambling in different population segments, Shaffer and Hall (2001) conducted a meta-analysis and summarized 139 distinct estimates from North American prevalence studies, including 32 samples with adolescents. Their calculations demonstrate a lifetime rate for pathological gambling (level 3 gambling) in adolescence of 3.38% (past-year prevalence: 4.8%) and a lifetime level of adolescent

[1]There is still much controversy about terminological issues. In general, "pathological gambling" refers to a diagnosable psychiatric disorder and thus to clinically significant symptoms and is limited to the far end of a continuum of gambling involvement. However, the term "problem gambling" is used in two different ways: (a) to describe solely less serious (mild to moderate) problems associated with gambling activities on a subclinical level or (b) to encompass all levels of gambling problems without distinguishing between different severities. Throughout this chapter, we will use the term "problem gambling" to refer to all gambling behavior associated with harmful effects.

problem gambling (level 2 gambling) of 8.4% (past-year prevalence: 14.6%). European prevalence studies also have identified small but significant number of adolescents can be classified as problem gamblers (e.g., Becoña Iglesias, del Carmen Míguez Varela & Vázquez González, 2001 [Spain]—5.6%; Johansson & Götestam, 2003 [Norway]—1.8%; Fisher, 1999 [UK]—5.6%; Lupu, Onaca & Lupu, 2002 [Romania]—6.8%). Despite methodological inconsistencies, these prevalence studies highlight the growing need (a) to introduce effective prevention programs for adolescents to diminish the incidence of problem adolescent gambling and (b) to implement appropriate treatment facilities for adolescents to avert further maladaptive outcomes and foster a behavioral change.

Individual Factors

The empirical foundation of preventive action and intervention efforts arises from research determining risk and protective factors. Risk factors are defined as conditions associated with an increased likelihood of a negative outcome (e.g., gambling problems). Protective factors are those conditions that reduce the potential of developing symptoms of psychosocial maladjustment or moderate the effect of exposure to risk factors (e.g., Coie et al., 1993). In accordance with other problem behaviors, the development and maintenance of problem gambling cannot be explained by a single factor. Within the individual domain, several risk factors such as demographic features (gender, age, ethnicity), biological/biochemical, personality, cognitive, gambling-related factors, and factors related to the engagement in other problem behaviors seem to be associated with adolescent problem gambling. These are briefly examined in turn.

Gender

More boys are regular gamblers than girls (Griffiths, 1991; Gupta & Derevensky, 1998). Furthermore, they are more likely to be classified as problem gamblers (e.g., Fisher, 1999; Griffiths, 1995; Ladouceur et al., 1999; Poulin, 2000; Winters, Stinchfield & Fulkerson, 1993). Jacobs (2000) summarizes gender differences among juvenile players and draws the following conclusions: Male juveniles tend to spend more time and money when gambling, initiate gambling earlier, enjoy more skill-based games, and gamble on a greater number and variety of games. However, there are studies that do not show these general trends (e.g., Volberg, 2002).

Age

While preferences for gambling forms differ according to developmental level, age does not constitute a solid predictor of problem gambling during adolescence in most studies (e.g. Fisher, 1999; Poulin, 2000). Thus, in general, there seems to be no association between age and prevalence rates of problem gambling—although there are exceptions (e.g. Ladouceur et al., 1999; Shapira et al., 2002; Volberg, 2002). More important than the link between age and problem gambling appears to be the age of onset. The sooner the initial contact into gambling, the higher the risk of developing gambling problems upon reaching adulthood. For instance, Shaffer et al. (1994)

reported pathological gamblers first gambled at an age of 9.7 years, whereas the average age of onset for their non-pathological counterparts was 11.6 years. Such findings have been reported consistently by other researchers (e.g. Griffiths, 1990; Volberg, 2002; Winters et al., 1993).

Ethnicity

Although research findings have been conflicting, several studies suggest ethnic minorities are at greater risk to develop problems related to gambling, for example, Aboriginals (Alberta Alcohol and Drug Abuse Commission, 2003a) and American Indians (Zitzow, 1996). Likewise, Volberg (2002) found higher prevalence rates among black and Asian adolescents with gambling-related problems compared to adolescents from other racial groups. Shapira et al. (2002) noted that African American adolescents are the population most likely to be pathological gamblers in Florida, as measured by the *DSM-IV* criteria. In the UK, Fisher (1999) reported ethnic background did not correlate with problem gambling. However, Griffiths (2000) found a high rate of problem scratchcard gambling amongst a population consisting almost entirely of Asian (Muslim) adolescent gamblers.

Genetics

Genetic factors may influence pathological gambling by multiple pathways. It is unlikely that a single gene is responsible for pathological gambling. Genetic studies with adults may provide insight into the genetic basis of pathological gambling. Evidence has come from twin studies (Eisen et al., 1998; Winters & Rich, 1998), showing that inherited and/or shared environmental experiences explain approximately half of the variance associated with pathological gambling in males. Comings et al. (1996) conducted a molecular genetic study providing further support for a shared genetic component for pathological gambling linking the Taq A1 allele, a specific variant of the human dopamine D2 receptor gene (DRD2), to pathological gambling. More recently, Comings et al. (2001) demonstrated that several genes for dopamine, serotonin, and norepinephrine metabolism contributed significantly to the risk of pathological gambling. However, further evidence is needed to monitor the relative importance and changes of genetic effects during the lifespan.

Biology/Biochemistry

Neurotransmitter genes are believed to play a significant role in mediating reinforcement effect in the brain. Thus, recent theoretical models of the development and maintenance of pathological gambling highlight the significance of neurobiological mechanisms (e.g., Potenza, 2001). Furthermore, brain monoamines such as dopamine, norepinephrine, and serotonin seem to underlie certain behavioral patterns. Several functions important in pathological gambling are worth noting: (a) abnormalities in the reward mechanisms related to the mesocorticolimbic dopamine circuitry, (b) a behavioral inhibition and disinhibiton mechanism mediated by the serotonergic system (serotonin dysfunction is associated with impulsive disorders and thus implies a deficit in cerebral inhibition), and (c) abnormalities

in an arousal mechanism related to the dorsal tegmental noradrenergic system (e.g., Potenza, 2002).

A recent study using functional magnetic response imaging suggests similarities in the brain processes involved in the anticipation and experience of monetary gains and losses and those of euphoria-inducing drugs (Breiter et al., 2001), whereby the ventromedial cortex has been implicated in the processing of monetary gains and losses (Gehring & Willoughby, 2002). Also, the first functional magnetic resonance imaging (fMRI) study of exclusively male pathological gamblers confirm that gambling cues elicit gambling urges and leads to a temporally dynamic pattern of brain activity changes (Potenza, et al., 2003). Finally, a number of studies have found associations with frontal lobe dysfunctions and pathological gambling, in particular regarding decision-making impairment (e.g., Cavedini et al., 2002) and exceptionally high rates of EEG abnormalities among pathological gamblers (e.g., Regard et al., 2003). Next to these results based on adult samples, Chambers and Potenza (2003) propose that during adolescence, normative neurodevelopment involves a relative immaturity of frontal cortical and subcortical monoaminergic systems that underlies impulsive behavior and thus can be responsible for an increased vulnerability to addictive behaviors among youths.

Personality/Emotional or Mental State

Numerous studies have tried to identify core personality traits or factors related to the emotional/mental state of adolescent problem gamblers. Based on previous reviews of the empirical research literature (Derevensky et al., 2003; Dickson, Derevensky & Gupta, 2002), the most important factors can be summarized as follows: adolescent problem gamblers have lower self-esteem and higher rates of depression, including a heightened risk for suicide ideation and suicide attempts; show poor or maladaptive general coping skills; and tend to use more emotion and avoidant coping styles. In addition, youth with gambling problems score high on measures of risk-taking, sensation-seeking, excitability, extroversion, anxiety, and low on measures of conformity and self-discipline.

Cognitions

Cognitive biases also play a significant role in the development and maintenance of problem gambling among adolescents (e.g., Griffiths, 1994; Ladouceur, Ferland & Fournier, 2003). In particular, young men seem to have overinflated views about their chances of winning and the influence of their own behavior in controlling chance outcomes (Moore & Ohtsuka, 1999). Such cognitive distortions reflect a normative phenomenon when gambling and thus do not provide a sufficient explanation of why individuals gamble in excess. However, cognitive biases are more prevalent among adult problem gamblers when gambling involvement increases (Ladouceur & Walker, 1996).

Engagement in Other Problem Behaviors

Research clearly demonstrates that adolescent problem gamblers engage in other potentially addictive behaviors, such as use of tobacco, alcohol, and illegal drugs to

a greater extent than non-problem gamblers (Griffiths & Sutherland, 1998; Vitaro et al., 2001; Winters et al., 2002). In addition, they are prone to be involved in delinquent behaviors (e.g., Gupta & Derevensky, 1998; Ladouceur et al., 1999; Winters et al., 1993). Yeoman and Griffiths (1996) report that approximately 4% of juvenile crime was associated with gaming machine use and further provide limited evidence that a minority of juveniles aged 10–17 years commit crimes in order to supplement their gambling. According to Stinchfield et al. (1997), antisocial behavior, gender (i.e., being male), and lifetime alcohol use explained 25% of the variance in highest level of gambling frequency. Compared to their peers, adolescent problem gamblers also show a wide range of school-related difficulties. Differences between groups were obtained for being expelled from class by a teacher, failing a course or academic year, academic achievement, and time spent studying on homework (Ladouceur et al., 1999). Furthermore, young problem gamblers are more likely to truant from school, argue, lie, and steal in relation to their gambling (Fisher, 1999; Griffiths, 1995).

In addition to the bulk of correlation studies, very few studies with longitudinal designs investigated the predictive links shared by (problem) gambling, substance use/abuse, and delinquency. The abuse of alcohol among male adolescents represents a predictor for a subsequent increase in gambling over time or a pattern of stability of regular gambling activities, respectively (Barnes et al., 2002). Higher parental monitoring of the leisure activities of adolescents operates as a puffer between alcohol abuse and frequent gambling participation. For females, alcohol misuse predicts an increasing pattern of gambling only when additional factors were present. Thus, alcohol abuse seems to be a causal risk factor for high rates of gambling (see also Vitaro et al., 2001).

Summarizing the literature, Winters and Anderson (2000) suggest three possible developmental pathways for risk status, substance use disorders, and problem gambling that warrant further investigation. Pathway 1 reflects an indirect process—a high-risk status may contribute to a developmental disorder (e.g., conduct disorder), which in turn predicts problem gambling or other substance use disorder. Alternatively, pathway 2 suggests that belonging to a high-risk group enhances vulnerability for both disorders directly and independently. In contrast, pathway 3 implies that a high-risk status leads to a substance use disorder. Adolescent gambling problems may result from a substance use disorder. We also suggest a fourth plausible pathway that must be addressed empirically in future—can (problem) gambling function as a "gateway drug" that makes a substance use disorder more likely during the course of development?

Family Factors

Youth problem gambling is strongly related to how the adolescents perceive parental gambling. Many researchers (e.g., Fisher, 1999; Gupta & Derevensky, 1998; Ladouceur et al., 1999; Winters et al., 1993) have shown that adolescent pathological gamblers are more likely to have a mother or father with gambling problems than adolescents who have not been classified as pathological gamblers. Some parents even purchase lottery tickets and scratchcards for their children (Wood & Griffiths, 1998). Furthermore, a majority of adolescents tend to gamble with family members, with most parents unconcerned with their children's gambling participation or lacking

knowledge about adolescent problem gambling (Fisher, 1999; Ladouceur et al., 1998). Family structure also seems to be linked to adolescent problem gambling, even though research findings are not straightforward. Fisher (1999) and Volberg (2002) have found that young people from single-parent families are at greater risk to be classified as problem gamblers. Winters et al. (1993) could not confirm these associations—neither to family composition, nor to family closeness.

Social and Community Factors

Addictions always result from an interplay of multiple factors, including the individual, the social environment, and the nature of the activity itself—a paradigm that resembles the public health triad of host, environment, and agent (Korn & Shaffer, 1999). Focusing on the gambling activity, Griffiths (e.g., 1999, 2003) has consistently argued that situational and structural characteristics can play an important contributory factor in gambling acquisition, development, and maintenance. For instance, situational or ecological determinants of gambling are important in the initial decision to start gambling. These characteristics are primarily environmental features, such as the location of the gambling venue, the number of gambling venues in a specific area, or advertisements that stimulate people to gamble and thus encompass important dimensions such as availability, acceptability, and accessibility of gambling. For example, an active promotion combined with an easy accessibility of gambling outlets may foster the initial contact with gambling, and thus the risk of maladaptive developmental courses. Structural characteristics have implications for the gamblers' motivation by reinforcing their gambling activities and satisfying their needs. They also have the potential to induce excessive gambling. Griffiths (e.g., 1999, 2003) has summarized the most important structural characteristics (see below).

Structural Characteristics of Gambling that Increase the Attractiveness of Gambling for Adolescents and Thus Its Addiction Potential (Griffiths, 1999, 2003)

Variable stake size (including issues around affordability, perceived value for money)
Event frequency (time gap between each gamble)
Amount of money lost in a given period of time, which is important in chasing behavior
Prize structures (number and value of wins)
Probability of winning
Size of jackpot
Skill and pseudo-skill elements (actual or perceived)
Opportunities of "near misses" (number of failures that are close to being successful)
Lights, color and sound effects
Social or asocial nature of the game
Rules of the game
Use of tokens, chips or credit cards (which temporarily disrupts the financial value system)

As Griffiths (1999) points out, the most important factors appear to be the accessibility of gambling and the event frequency. When these characteristics are combined, the greatest problems occur. Not surprisingly, juveniles reporting gambling problems prefer rapid, continuous, and interactive games (Jacobs, 2000). Relationships between regulatory policy and (problem) gambling behavior in adolescence have not been explored. Given the research, it is necessary to gain further insight into the effect of gambling policy and adolescent engagement in gambling (e.g., investigate the impact of restrictions or number of gambling venues). Concurrent with the implementation of policy intervention, research has to monitor and evaluate their effects systematically in order to adjust policies accordingly.

Summary

Nearly all the risk factors outlined above stem from epidemiological research and are correlative in nature. The underlying mechanisms, precursors, and consequences of gambling problems as well as the causal nature of these relationships still need to be confirmed empirically. Furthermore, no established peer-reviewed research literature on protective factors exist with respect to problem gambling in adolescence. A selection of protective factors that minimize the occurrence of problem behaviors or mental disorders during adolescence and childhood are listed in Table 1 and may also be applicable for problem gambling.

Overall, these findings could be taken as a starting point and may foster research, eventually delineating discrete pathways leading to the development of distinct subgroups (e.g., adolescence-limited versus life-course persistent problem gambling).

Table 1. Conditions that Minimize the Risk of Occurrence of Problem Behaviors or Mental Disorders in Childhood and Adolescence (Adapted from Scheithauer et al., 2004)

Protective factors with regard to the individual/resiliency	Protective factors with regard to the family and environment
Positive temperament (flexible, active)	Stable emotional relation to a caregiver (emotional support)
Adequate impulse control	Supporting family climate
Intelligence (better-than-average)	Family cohesion/positive bonding
Special abilities and interests in hobbies	**Parental monitoring/supervision**
Prosocial behavior	**Adaptive school performance/school-Connectedness**
Communication skills (speech)	Clear, prosocial normative expectations
Positive self-esteem	Positive role models in terms of coping (e.g., Relations to peers having prosocial norms and who are not drug users)
Social skills*	
Sense of self-efficacy	
Active coping strategies	
Internal locus of control	Social support networks
Anticipating behavior	Girls: support and autonomy
Self-confidence	Boys: structure and rules at home
Strong ethnic identity	**Availability of and participation in prosocial activity**
	High social and academic expectations
	Perceived connectedness with school and participation in extracurricular activity

* Note: Protective factors for which first empirical evidence exists with respect to problem gambling in adolescence are bold (see Alberta Alcohol and Drug Abuse Commission, 2003b).

Nower and Blaszczynski (2004) propose such a pathways model of pathological gambling as a harm-minimization strategy to guide educators in assessing, discriminating, and managing discrete subgroups of youth problem gamblers and referring them to appropriate services. The pathways model takes a multiple range of interacting risk factors into account. Furthermore, it suggests three distinct routes leading to adolescent problem gambling, implying three clinically different subgroups (i.e., behavioral-conditioned, emotionally vulnerable, and antisocial impulsivist youth gamblers). Although phenomenologically similar, etiological differences suggest a differentiated application of intervention and prevention strategies. However, the causal pathways of this model have to be tested empirically.

Evidence-Based Treatment Interventions in Community Settings

What Works

Treatment approaches cover a wide ride of activities and are based on various theoretical foundations. However, there is a sparse description of treatment studies in the literature related to adolescent pathological gambling. In fact, no controlled studies with random assignment and comparison groups could be found that provided empirical evidence for the effectiveness of treatment approaches related to adolescent pathological gambling. Thus, a review of the literature did not reveal a program that met the standard for what works.

What Might Work

Only two empirically evaluated therapeutic approaches to treat adolescent pathological gambling have been reported in the literature. Ladouceur, Boisvert, and Dumont (1994) conducted a study evaluating the effectiveness of cognitive-behavioral treatment with four male pathological videopoker players aged 17–19 years. This multimodal treatment approach consisted of five components: (a) information about problem gambling, (b) cognitive interventions, (c) problem-solving training, (d) social skills/assertiveness training, and (e) relapse prevention. Individual treatment lasted approximately three months; after treatment was completed, clinically significant improvements for the perception of control as well as reductions in the perception of the severity of gambling problems were found. At two follow-ups after three and six months, respectively, all participants had ceased their gambling.

Gupta and Derevensky (2000) introduced an eclectic therapy to treat 36 male adolescent problem gamblers. The participants were 14–21 years old and sought treatment over a five-year period. Individual therapy was provided weekly and consisted of detailed intake assessment, establishing acceptance of the problem, identification of underlying problems and addressing personal issues, development of adequate coping skills, restructuring of free time, involvement of family and social support, cognitive restructuring, establishing debt repayment plans, and relapse prevention. During one-year follow-up, 35 adolescent gamblers were abstinent and also improved on measures of depression, drug and alcohol use, and peer/family relationship. Due to the individual (and thus heterogeneous) approaches including variability in number of sessions and the high motivational base (adolescents actively seeking treatment), the efficacy cannot be adequately determined.

Taken together, these two studies suggest that a cognitive-behavioral approach, including cognitive restructuring, problem-solving, social skills training, and relapse prevention might effectively treat adolescent problem gamblers. Although cognitive-behavioral strategies have been most effective in treating adults (e.g., Meyer & Bachmann, 2000), further randomized studies are necessary to confirm this for the adolescent population. Cognitive-behavioral treatments appear to pay insufficient attention to motivational factors, as many gamblers are ambivalent about stopping with an activity that has been both a source of excitement and likewise a source of great suffering. The *stages of change* derived from the transtheoretical model of intentional behavior change provide a valuable theoretical framework (Prochaska, DiClemente & Norcross, 1992) for understanding the motivational processes underlying behavioral change for individuals struggling with addictions. According to this model, individual progress occurs not necessarily in a linear way. Rather, for most addicted people, change is a dynamic process with fluctuating motivations. There are thus identifiable stages, including resistance (precontemplation), contempletation, preparation, action, and maintenance (and relapse). Consequently, DiClemente, Story, and Murray (2000) have suggested the applicability of this model for gambling problems in youth, with empirical research currently underway.

Further valuable ideas can be derived from Bellringer (1992), who outlined a non-theoretical treatment approach for young problem gamblers with ten key aspects that fall into two categories: preparation (P) and action (A). These key aspects can be used as guidelines and be viewed as a supplement to other treatment techniques as a process of therapy itself (see below).

General Guidelines in Treating the Adolescent Problem Gambler (Bellringer, 1992)

Preparation$_1$: understanding the issues and gaining insight;
P$_2$: structuring change (setting up a plan with realistic short-, medium-, and long-term goals and measurable objects);
Action$_3$: assessing the problem in detail (including the gambler's motivation to stop gambling);
A$_4$: providing counseling (empowering the adolescent to change, agreeing on boundaries, creating the right atmosphere and appropriate involvement of family or other helping agencies);
A$_5$: establishing trust and confidentiality, helping the gambler to be open and honest (and coming back);
A$_6$: building self-esteem, which is important in restoration of self-confidence;
A$_7$: providing support—should involve a support agency, including the practitioner, the practitioner's agency, other agencies, and the adolescent gambler's family, friends, and significant others (strengthening of relationships with family members is particularly important after treatment termination and/or as a tool of relapse prevention; eventually recommending group and attendance of self-help groups);

(continued)

A_8: assessing the adolescent gambler's financial situation (debt counseling: talking to creditors, cutting up credit cards, drawing up budget plans), gradually give back financial responsibility to the gambler as long-term goal;
A_9: developing alternative interests and replacing the time spent for gambling with a range of activities that are rewarding themselves;
A_{10}: measuring progress (provide effective feedback to the adolescent gambler, revising or resetting assessment and/or goals).

Another important issue is to identify why so few adolescents enroll in treatment programs. Griffiths (2001) reviewed many plausible explanations (e.g., there may be insufficient treatment opportunities specifically available for adolescents, available treatment programs may not be appropriate and/or suitable for adolescents, adolescent problem gamblers may undergo spontaneous remission and/or mature out of problems, the negative consequences may be attributed to other problem behavior, etc.). Although not every assertion made has been empirically tested, the list serves as a starting point for further research.

What Does Not Work

Given the paucity of scientifically validated evidence in this area, it is difficult to specify approaches that definitely do not work in treating adolescent gamblers. However, after reviewing the literature that deals with the treatment of adult problem gamblers (e.g., Meyer & Bachmann, 2000), we can infer that unimodal models ignoring the complex interaction of several risk and protective factors in the initiation, development, maintenance, and recovery of problem gambling will most likely lead to treatment failures.

Summary

Treatment paradigms must be adopted to the developmental needs, interests, concerns, behaviors, and difficulties that adolescents typically experience (Gupta & Derevensky, 2000). In general, health care systems have to adopt a multiple-option approach, including diverse treatment programs. These range from low-threshold (e.g., minimal intervention) to high-threshold (e.g., inpatient hospitals) approaches. Two important clinical issues still are unresolved: (1) how to make adolescents more motivated to seek treatment and (b) to define the type of therapeutic approach that is most effective in reducing adolescent gambling problems. Cognitive-behavioral approaches seem to be the most promising treatment alternative so far.

Evidence-Based Treatment Interventions in Residential Settings

What Works/What Might Work/What Does Not Work

To our knowledge, no trials have been published that empirically evaluate treatment approaches of pathological gambling in adolescence (either in inpatient hospitals, group homes, or residential schools). Thus, no statement can be made as to the

effectiveness of evidence-based treatment interventions for pathological gambling in residential settings. Based on the absence of empirical evidence, it is speculative to discuss effective components of treatment interventions for problem gambling in residential settings. As with treatment interventions in community settings, it seems important not only to tackle the gambling behavior itself, but also issues such as the identification of underlying problems that are producing stress (e.g., severed familial relationships), the restructuring of free time and the development of alternative (healthy) life-styles, establishing debt repayment strategies (where necessary), and relapse prevention (see Gupta & Derevensky, 2000).

Psychopharmacology

Neuro/biological studies suggest the involvement of various neurotransmitters in the etiology of pathological gambling. Medication that targets neurotransmitter systems appear to be successful in treating pathological gamblers. However, no study to date has examined pharmacological treatment of adolescent problem gambling. The use of three classes of drugs seem to be promising approaches to treat adult pathological gambling: selective serotonin reuptake inhibitors, opioid receptor antagonists, and mood stabilizers (e.g., Grant, Kim & Potenza, 2003; Pietrzak, Ladd & Petry, 2003; Potenza, 2002).

Of the medication tested, several selective serotonin reuptake inhibitors demonstrate preliminary evidence for their efficacy. Fluvoxamine and paroxetine have been shown to be superior to placebo in the short-term treatment of adults. But before recommendations can be made for adolescent pathological gamblers, long-term efficacy in treating adult pathological gamblers are needed. Additionally, despite preliminary evidence suggesting the usefulness of clomipramine, citalopram, and fluoxetine, it is premature to use these selective serotonin reuptake inhibitors in the treatment of adolescents—particularly because their safety in pediatric populations has not yet been determined. Aside from selective serotonin reuptake inhibitors, studies with naltrexone (an opioid receptor antagonist) has led to positive results in the treatment of adult pathological gamblers. Naltrexone directly blocks the transmission of dopamine in the nucleus accumbens and modulates dopaminergic paths that seem to be implicated in the etiology of addictions. However, possible side effects in the treatment of adolescents need to examined before recommending trials in populations with minors.

Summary

In general, systematic research in the area of psychopharmacology and problem gambling is recent and limited to small adult sample studies. Double-blind, placebo-controlled studies are required to assess efficacy for use with adolescents.

The Prevention of Problem Gambling

What Works

To date, little information exists concerning the effectiveness of programs for the prevention of problem gambling. All published and evaluated studies have used a universal approach, regardless of the gambling habits of the students before starting

the intervention. Correspondingly, these studies focused mainly on increasing knowledge and correcting misconceptions about gambling, but did not measure or obtain meaningful behavioral changes. General evidence shows that accurate knowledge about healthy and unhealthy behaviors (including, to some degree, attitudes toward these behaviors) does not necessarily affect the behavior itself (e.g., Durlak, 2003; Botvin, 2001, for the prevention of substance abuse in adolescents in particular). Thus, it is premature to draw a definite conclusion as to what type of preventive intervention works in terms of behavioral change related to problem gambling (e.g., age of onset, amount of money bet or time spent on gambling).

What Might Work

Due to the fact that certain cognitive factors play a key role in the development and maintenance of problem gambling or persistent gambling participation, prevention programs are mainly designed to target these cognitive misconceptions and/or to deliver accurate information about gambling. Gaboury and Ladouceur (1993) conducted the first gambling prevention study and created a mainly information-based prevention program in a classroom setting for high school students. The program consisted of three sessions covering several topics, such as providing general information about gambling, possible negative consequences of enduring gambling activities, the explanation of automatic behavior in gambling, and possible strategies to control gambling behavior. Results indicated that the experimental group improved their knowledge about gambling significantly. This difference was also evident at a six-months follow-up measurement. However, at six-month follow-up, no influence on actual gambling behavior, newly known coping strategies to control gambling behavior, or attitudes related to gambling could be observed.

A further study by Ferland, Ladouceur, and Vitaro (2002) targeted misconceptions about gambling with an amusing 20-minute video. According to the authors, the video captures the students' attention and interest in a cost- and time-effective way and probably does so better than traditional teaching. Seventh- and eighth-graders were randomly assigned to three experimental conditions and a control condition. Results showed that (a) the video session only, (b) the provision of information in combination with interactive learning elements (presentation of information), as well as (c) an integrated approach of both conditions are useful in increasing knowledge and correcting erroneous cognitions about gambling. Furthermore, the integrated approach (video plus presentation of information) provided the best approach in giving the students a more realistic view of gambling and in reducing their misconceptions about gambling. A study by Lavoie and Ladouceur (2004) confirmed the effectiveness of a video as a meaningful medium in order to achieve two goals: (a) to increase knowledge about gambling and (b) to decrease gambling-related attitudinal errors with Canadian students from grades 5 and 6. However, an information session that preceded watching the video did not turn out to be superior to the "video-only" condition.

Similarly, a youth gambling prevention program introduced by Ferland, Ladouceur, and Jacques (2000) shared the main characteristics of the Gaboury and Ladouceur (1993) program but added an interactive learning element. Students actively tested the concepts and ideas outside of the classroom using take-home activities. The learning portion of the prevention program consisted of three sessions

that (a) explained what gambling activities are, discussed the pitfalls of gambling, and helped to understand the concept of randomness; (b) put into practice a problem-solving strategy for resisting social pressures; and (c) addressed issues related to problem gambling. Preliminary results indicated a significant improvement of the students' knowledge and a decrease of misconceptions about gambling activities. However, behavioral data revealed that students did not succeed in improving their ability to solve problems.

More recently, Ladouceur et al. (2003) published a study that evaluated the effectiveness of gambling prevention activities for primary school students (first phase of the study) as well as comparing the relative effectiveness of two different prevention programs administered by a gambling expert and regular teacher, respectively (second phase of the study). This second phase of the study comprised three experimental conditions. For two experimental conditions, program components were drawn from the "Count me out" awareness program (see below), and provided by both the teacher and gambling expert. For the third experimental condition, three other interactive exercises were created and conducted by the gambling expert. These exercises were already used in the first phase of the study in order to target the modification of erroneous perceptions. Results supported the notion that erroneous perceptions among primary school students (fifth- and sixth-graders) can be reduced by a prevention program specifically designed to explain the concepts of chance and randomness. Furthermore, preventive exercises developed by the gambling experts had a bigger impact than elements drawn from the "Count me out" program. In addition, students benefitted more from a program delivered by an expert than by a regular teacher.

A more comprehensive approach was evaluated by Williams (2002), who designed a broad-spectrum school-based prevention program as an attempt to prevent problem gambling. The program contains five elements, both gambling-specific (e.g., information of gambling and problem gambling, correction of cognitive errors) and gambling-unspecific (teaching and rehearsal of decision-making and social problem-solving skills as well as adaptive coping skills). The program was implemented at a Canadian high school in order to advocate responsible gambling and enhance certain key life skills, but not necessarily to reduce gambling participation or even encourage abstinence from gambling. Control group comparisons took place one week and three months after the intervention had been completed. At both points, significant group differences were evident: increase of gambling-related knowledge, more negative attitudes towards gambling, and decrease of cognitive errors. However, no differences were evident with regard to the ability to calculate true gambling odds. Furthermore, the study did not find significant changes in gambling behavior due to the fact that gambling behavior decreased within both (experimental and control) groups.

Overall, very few controlled prevention studies have been published in peer-reviewed journals. Results obtained thus for display the usefulness of prevention programs to modify erroneous cognitions. However, robust and sustained behavior changes have not been demonstrated. There are several reasons why the results should be treated with caution. Firstly, the prevention of (adolescent) problem gambling is quite a recent area of research and still in its infancy. Secondly, the existing programs mainly promote knowledge about gambling-related issues and therefore are limited in scope. Thirdly, small sample sizes, short-term approaches, and restrictions to the North

American culture limit generalizations. Fourthly, most of the research was carried out by the same team; thus the findings need to be replicated by others.

What Does Not Work

Research from other areas clearly demonstrates that fear-inducing approaches techniques and information-only techniques are not successful in altering behavior (e.g., Durlak, 2003; Evans, 2003; Griffiths, 2003). In particular, these programs do not consider developmental tasks such as coping with social influences, which may effect health-threatening behaviors. Simply scaring young people is an ineffective way of preventing later problem behavior and should be avoided when designing programs to prevent problem gambling in adolescence. In a similar way, information-only approaches (e.g., the dissemination of information about psychoactive substances) have little positive effects on behavioral change. Furthermore, delivering information in the form of abstract and non-interactive teacher sessions may not be an optimal method to increase factual knowledge and as a consequence to prevent health-damaging behaviors such as problem gambling.

Summary

It is still unresolved what type of prevention program works with regard to enduring behavioral changes or if the positive effects reported have any long-lasting effect. Nevertheless, findings from universal cognitive-based approaches demonstrate that inappropriate perceptions related to gambling activities can be corrected among students at least in the short term, especially when not relying solely on a didactic, non-interactive approach. In addition, multiple non-evaluated programs exist, which may serve as a basis for an innovative and effective conception of a preventive program for adolescents or young adults, respectively. The list below gives insight into the range of efforts being made to address these populations in assumedly appropriate ways (see also Dickson et al., 2002; Nower & Blaszczynski, 2004; Williams, 2002, for further activities addressing problem and underage gambling, although these have not yet formally assessed and/or published in a peer-reviewed journal).

Promising but Not (Yet) Formally Evaluated Prevention Programs For Adolescents—A Selective Overview

1. "Don't bet on it" comprises a classroom-based prevention program developed for students from grades 9 to 12. The module consists of several interactive elements, curricular activities, and teaching units related to gambling issues (teacher reference materials and student handouts as well as an equivalent program for seventh–eighth graders called "All bets are off!" also are available from the Michigan Model for Comprehensive School Health Education).

(continued)

2. A creative effort to promote awareness and deliver the message that gambling participation can lead to negative consequences are plays like "After the Beep" or "Three-of-a-Kind," designed for high school students. In addition, discussing the content of the play may subsequently increase the awareness of high school students better than didactic approaches. (Source: Responsible Gambling Council Ontario).
3. Curricular activities as provided by Crites (2003), who suggested educating children in the area of probabilities and statistics using gambling-related scenarios. The range of specific innovative hands-on activities gives insight into the workings of the lottery and the games of keno, roulette, and craps and can be easily integrated into mathematic lessons. Such approaches may promote critical thinking among the students and equip children and adolescents with knowledge about the nature of random events or the expected monetary value when participating in gambling.
4. "Count me out" ("*Moi, je passe*") is another school-based program awareness program addressed to students in the last three years of primary school and in high school. The program has already been applied in Quebec. Its components include information about gambling in general, erroneous beliefs and inaccurate cognitions, and the promotion of personal/social skills. Material resources include a CD-ROM and a video, among other things, and the program explicitly offers activities that correspond to the students' stage of development (Le Group Jeunesse, 2000).
5. An example of an interactive opportunity to deal with gambling-related issues can be found online at http://www.youthbet.net. This page was developed by the TeenNet Gambling Project (Department of Public Health Sciences, University of Toronto) and provides a virtual neighborhood environment with several locations that encompasses gambling settings (casino, store) where informal gambling activities take place (playground) and information resources (library, community centre) developed with teenagers for teenagers.

Recommendations

To date, the paucity of knowledge about the pathogenesis of problem gambling makes it difficult to develop and implement comprehensive prevention and intervention actions for adolescents. Therefore, in the first instance, gambling research needs to establish a comprehensive multicausal etiological and testable model including causal pathways (e.g., Nower & Blaszczynski, 2004) with modifiable risk as well as protective factors. The small body of gambling research (e.g., with regard to protective factors or the exact mechanisms of action for specific risk factors) does not permit us to draw conclusions in terms of best practices so far. Nevertheless, prevention studies of alcohol, tobacco, and other drugs provide valuable insights and useful information on how to design effective prevention programs for problem gambling in adolescence (e.g., Evans, 2003). Strategies that encompass motivational issues, resisting peer group pressures (including adequate responses to common advertising appeals), and correcting erroneous social perceptions seem to be the most promising approaches to successfully alter behavior.

Evidence from related disciplines strongly suggests that fear or scaring strategies display an ineffective and insufficient way of yielding positive (behavioral) outcomes. Instead of labeling gambling as deviant, evil, or even sinful, (gambling) prevention programs must offer young people a way to develop adequate personal skills and social competencies. One of the most important issues encompasses the concept of social inoculation—inoculating adolescents with the knowledge and skills necessary to resist social pressures with regard to risk behaviors to which they may be exposed. According to Gupta and Derevensky (2000) prevention models must (a) increase awareness of adolescent problem gambling, (b) enhance knowledge about youth problem gambling, (c) change attitudes toward gambling and encourage adoption of a more balanced view, (d) teach effective coping and adaptive skills, and (e) correct inappropriate cognitions related to gambling activities (i.e., role of skill, illusion of control, gambler's fallacy, assessment of the odds of winning). Eventually, prevention and especially treatment efforts should recognize the striking link between problem gambling and substance abuse and thus the possibility of "switching addictions."

In the future, one of our main goals must be to connect research findings, theory, and prevention science with practice. More research is needed that evaluates methods and materials of gambling prevention programs in order to support the effective implementation of empirically based practices. Important key actions, research, and practical challenges around adolescent gambling are summarized in below. How we meet these challenges will determine the extent to which future generations throughout the world will develop gambling-related problems.

Key Actions, Research, and Practical Challenges Around Adolescent Gambling (Dickson et al.; 2002; Korn & Shaffer, 1999; National Research Council, 1999; Shaffer et al., 2003; Stinchfield & Winters, 1998)

A. Risk and protective factors

- Conduct a more rigorous comparison between risk factors of adolescent problem gambling and other problem domains and translate empirical knowledge into science-based prevention and treatment initiatives
- Arrange studies with longitudinal designs to determine causal risk factors and protective factors preceding the outcome of problem gambling and highlight typical developmental pathways
- Confirm study findings with different study methods and designs, across populations, and in other cultures
- Identify whether certain gambling forms serve as a "gateway drug"

B. Prevention and treatment

- Raise public awareness about the extent of adolescent problem gambling, especially among parents and educators (see Shaffer et al., 2000)

- Incorporate gambling-related information and prevention efforts quickly and economically into already existing and effective mental health and education programs
- Establish primary prevention programs within the curricula of elementary, middle, and high schools
- Provide well-timed, long term, and sufficient-dosage actions and consider the evolving needs of adolescents and issues like transitions or certain developmental tasks (including age-, gender- and culture-specific approaches in terms of program materials and intervention techniques)
- Stimulate high-quality research related to the treatment of adolescent pathological gamblers
- Carefully evaluate the effectiveness of prevention programs and treatments in inpatient and outpatient settings for different types of adolescent problem gamblers
- Include family members or associates as a continuing supportive resource
- Reach young people who are absent from school (e.g., truancy, school drop-out), who are more likely to be engaging in gambling and other potentially addictive behaviors

C. Policy

- Determine the utility of regulatory gambling policy and subsequent proliferation of gambling
- Raise the minimum age of all forms of commercial gambling to 18 years and impose stricter penalties for gambling operators who allow children and adolescents to gamble illegally
- Assure the consistency of public policies strategies, ensure that laws, policies and the content of prevention programs need to be coherent
- Evaluate the impact of structural characteristics of gambling technologies with regard to the needs of adolescents
- Evaluate the impacts of the evolvement of new gambling opportunities (e.g., internet gambling, interactive TV gambling, betting with mobile phones)
- Install task forces to monitor problem gambling issues explicitly, including adolescent problem gambling
- Foster collaboration among researchers, policy makers, program advocates, and community leaders to produce rigorous and useful research evidence (input from all stakeholders is necessary to form synergetic effects and bring research into practice)

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