

## **The Prevention of Gambling Problems in Youth: A Conceptual Framework**

**Laurie M. Dickson**  
**Jeffrey L. Derevensky**  
**Rina Gupta**  
*McGill University*

---

Despite increased awareness of the need to begin educating young children about the potential dangers of gambling, empirical knowledge of the prevention of adolescent problem gambling and its translation into science-based prevention initiatives is scarce. This paper poses the question of whether or not the common elements of tobacco, alcohol, and illicit drug abuse prevention programs can be applied to gambling prevention. Common risk and protective factors across addictions, including gambling, appear to point to the need to develop a general model of primary, secondary, and tertiary prevention. The authors present the need for science-based prevention initiatives and describe a general adolescent risk-taking model as a basis for science-based prevention of adolescent problem gambling and other risk behaviors.

---

**KEY WORDS:** youth gambling; addictive behaviors; risk taking; prevention.

A recent report by the Australian Productivity Commission cautions against attempts to quantify the costs and benefits of gambling industries (Australian Productivity Commission, 1999). Nevertheless, several reports (e.g., Azmier & Smith, 1998; National Gambling Impact Study Commission, 1999; Walker & Barnett, 1999) have sought to provide a detailed picture of the significant economic, social, and individ-

---

Please address all correspondence to Jeffrey L. Derevensky, International Centre for Youth Gambling Problems and High-Risk Behaviors, McGill University, 3724 McTavish Street, Montreal, Quebec, Canada H3A1Y2; e-mail: Jeffrey.Derevensky@mcgill.ca.

ual costs that gambling has incurred. Grasping the consequences of adolescent problem gambling is an even more arduous task in light of the widespread attitude that youth are not often active contributors to society, and the perception that few have significant gambling or gambling related problems. Youth problem gamblers are not viewed as hitting the same 'rock bottom' that often typify and motivates the adult problem gambler to seek treatment nor is there generally a loss of jobs, homes, or families, associated with significant youth gambling problems.

Yet our current empirical knowledge of youth problem gambling includes a profile of the adolescent gambler that reflects the serious nature of gambling-related problems for youth. Adolescent problem gamblers have been found to have lower self esteem (Gupta & Derevensky, 1998b), higher rates of depression (Gupta & Derevensky, 1998a, 1998b; Marget, Gupta & Derevensky, 1999; Nower, Derevensky, & Gupta, 2000), poor general coping skills (Marget, Gupta & Derevensky, 1999; Nower, Gupta & Derevensky, 2000), higher anxiety (Gupta & Derevensky, 1998; Vitaro, Ferland, Jacques & Ladouceur, 1998) and are at heightened risk for suicide ideation and attempts (Gupta & Derevensky, 1998). (For a detailed summary of our current existing empirical knowledge of adolescent problem gamblers see the reviews by Derevensky & Gupta, 2000; Gupta & Derevensky, 2000).

Immediate consequences of adolescent problem gambling have been identified in several studies. Problem and pathological gambling has been shown to result in increased delinquency and crime, disruption of familial relationships and decreased academic performance (Fisher, 1993; Gupta & Derevensky, 1997a; Ladouceur & Mileault, 1998; Wynne, Smith, & Jacobs, 1996). These youth are greater risk-takers and are at increased risk for the development of an addiction or poly-addictions (Gupta & Derevensky, 1998a; Lesieur & Klein, 1987; Winters & Anderson, 2000).

Speculation of the long-term consequences of adolescent problem gambling does not present a promising outlook. Current adolescent prevalence rates of problem gamblers, estimated to be between 4–8% of the adolescent population, are two to four times that of adults (Gupta & Derevensky, 1998a; Jacobs, 2000; National Research Council, 1999; Shaffer & Hall, 1996). Furthermore, the rapid movement from social gambler to problem gambler (Gupta & Derevensky, 2000; Gupta & Derevensky, 1998a) and the identification of gambling as a rite of initiation into adulthood (Svendsen, 1998) points to the possibility

that adolescents are also more susceptible to developing gambling-related problems.

Given the widespread proliferation of the types of gambling activities attractive to youth and their widespread availability, the negative consequences associated with problem adolescent gambling should provide sufficient incentive to find ways of dealing with such costs and preventing problem development whenever possible. Increased efforts to understand the economic, social and psychological costs of gambling, and the recognition of the adolescent population as being particularly at risk for developing problem behaviors such as delinquency and substance abuse (Baer, MacLean, & Marlatt, 1998; Jessor, 1998; Luthar, Cicchetti, & Becker, 2000a) and gambling-related problems (Gupta & Derevensky, 1998a; Gemini Research, 1999; Wynne, Smith, & Jacobs, 1996) amplifies the necessity for effective prevention initiatives targeting children and youth.

While it has been noted that little progress has been made in understanding the treatment of problem adolescent gambling or the characteristics of those seeking help (Gupta & Derevensky, 2000), empirical knowledge of the prevention of this disorder and its translation into science-based prevention initiatives is particularly scarce. In fact, it has only been in the past two decades that an interest in general human development has converged with the examination of causes and remedies for psychological disorders (Coie et al., 1993). This new conceptual approach which Coie and his colleagues termed *prevention science* has formed the basis of school-based prevention efforts. Fortunately, the field of prevention of youth gambling problems can draw upon the substantial research on adolescent alcohol and substance abuse prevention which has a rich history of research, program development and implementation, and evaluation. Researchers, treatment providers, and educators would benefit by incorporating our current knowledge of youth gamblers with the insights of substance abuse prevention to help shape the future directions for the prevention of youth gambling problems.

## PREVENTION

To lay the foundation for youth problem gambling prevention efforts, it is important to operationally define what is meant by the term 'prevention' as this has been a source of contention amongst mental

health professionals (Luthar, Cicchetti, & Becker, 2000b; Robinson, 2000). Prevention can best be viewed as those efforts that seek to evade the onset of a particular problem behavior, and subsequently promote outcomes that are significantly better than one might expect (Luthar, Cicchetti, & Becker, 2000a). This definition is predicated upon the empirical data suggesting that most individuals are affected negatively by particular adversity (this adversity is often dependent upon the frequency, duration, and severity of such occurrences at a given developmental period). From a developmental psychopathology perspective, the efficacy of prevention programs aimed at minimizing problem gambling will be most effective if conceptually driven from research on resiliency during adolescence, given the finding that gambling remains a highly socially acceptable adult activity (Azmir, 2000; Gupta & Derevensky, 1997a).

#### *Resilience Research in Youth*

The resiliency literature is predicated upon the findings that some individuals appear more immune to adversity, deprivation and stress than others. For example, one child raised in a family with parental conflict and substance abuse may do well while another sibling may go on to develop an addiction, suicidal ideation or suicidal behavior. It remains inevitable that all individuals face stressful life events and children, similar to adults, have different adaptive behaviors and often unique ways of coping. A child living with a parent who has a gambling problem may ultimately develop similar gambling behaviors, other psychological problems and/or delinquent behaviors. On the other hand, we know that certain individuals who have been exposed to excessive and pathological gambling by a parent appear to be resilient. These youth may become community involved citizens, excel academically, and enter healthy mentoring relationships with another adult. Such youth, who do well despite experiences of multiple stressors, are perceived to be 'resilient' (Garmezy, Maston, & Tellegen, 1984; Werner & Smith, 1982).

Similar to other psychological constructs, the theoretical and empirical literature on resilience lacks consensus on its definition (Tarter & Vanyukov, 1999). Luthar et al. (2000a) conceptualize resilience as *a dynamic process encompassing positive adaptation within the context of significant adversity*. Resiliency is not a fixed attribute and can vary, depend-

ing on the adversities faced, developmental period, and the general environment surrounding. Those youth who have not developed a gambling problem or other addictive behavior despite unfavorable circumstances, have adapted at that particular time, to the various stressors (risk factors) they face.

Resiliency has been thought to be related to biological, self-righting dispositions in human development (Waddington, 1942, 1957) and to the protective mechanisms that work in the presence of stressors (Rutter, 1987; Werner & Smith, 1982). Resilient youth seem to be able to more effectively cope with stressful situations and emotional distress in ways that enable them to develop appropriate adaptive behaviors and to go on and become competent people. It is important to note that a young person can be more resilient in relation to one outcome but not another. For example, a child may grow up with an alcoholic parent and be academically and socially competent but struggle with depression. As we examine the construct of resiliency and its relationship to youth problem gambling, we need to differentiate between *forms* of resiliency and *domains* of resilience.

According to Masten, Best and Garmezy (1990), resiliency can consist of three types: a) at-risk youth showing better-than-expected outcomes, b) the maintenance of positive adaptation despite the occurrence of stressful experiences, and c) the ability to recover well from trauma. Research on resiliency and youth problem gambling is expected to follow the first two of these forms although Jacobs (personal communication) has recently speculated and argued for investigating early trauma in individuals with gambling problems. Delineating areas of competency, such as social, academic, and emotional competencies will help preventionists to formulate more realistic goals and strategies for prevention programs and to examine specific outcomes of programs.

#### *A Profile of Resilient Youth*

If gambling prevention programs are to incorporate the promotion of resiliency among youth as its over-arching goal, it is important to describe the profile of the adolescents who have overcome diversities, such as growing up in a family where parental gambling is a problem, and gone on to be competent, healthy adults. Empirical research, in general, supports a positive profile that includes:

- Problem solving skills including the ability to think abstractly and generate and implement solutions to cognitive and social problems;
- Social competence which encompasses the qualities of flexibility, communication skills, concern for others, and pro-social behaviors;
- Autonomy which includes self-efficacy and self control;
- A sense of purpose and future as exhibited in success orientation, motivation, and optimism.

These general attributes have been shown to be consistent amongst resilient youth (Brown, D'Emidio-Caston, & Benard, 2001).

*A Resilience Focus in the Field of Tobacco, Alcohol, and Drug Abuse Prevention*

Efforts aimed at preventing tobacco, alcohol, and drug use amongst youth have existed for many years. Its history of prevention has stimulated the field toward refinement of efforts through theoretical reformulations, evolution of research goals, refinement of research methodology and program evaluations. Most significantly, it is now generally acknowledged that it is crucial for prevention efforts to be empirically, science-based (Brounstein, Zweig, & Gardner, 1999). Despite findings that the majority of meta-evaluations and comprehensive studies of prevention efforts have generally revealed nonexistent or negligible effects in affecting alcohol and illicit drug use among adolescence (Gorman, 1995; Hansen, 1992) and smoking (Peterson, Kealey, Mann, Marek, & Sarason, 2000), the evolution of addiction prevention research has resulted in efforts that progressively have yielded better outcomes. While early prevention efforts were largely not theory driven, had ill-defined target populations, and lacked specification of outcome measurement variables, more recent science-based programs such as the Center for Substance Abuse and Prevention Eight Model Programs (Brounstein et al., 1999), are based upon the empirical evidence of their effectiveness and are currently being applied in several communities.

Theoretical and empirical research which point to commonalities between problem adolescent gambling and other addictions suggests that prevention efforts arrived at other addictions are rich sources of

information to those working towards the prevention of youth problem gambling. Jacobs' *General Theory of Addiction* (1986, 1998) provides a useful theoretical framework from which to consider commonalities among addictions. His general theory of addiction construes addiction as a dependent state acquired over a period of time by a predisposed person in efforts to relieve a chronic stress condition (Jacobs, 1986). Accordingly, physiological and psychological predisposing factors must coexist and come into operation in a stressful environment. The theory further posits that addictive behaviors fulfill a need to escape from stressful realities. Multiple addictions are common among chemical dependencies (Winters & Anderson, 2000) and it has been found that severity in one addiction likely increases the severity in others (Nower, Gupta, & Derevensky, 2000). Evidence that adolescent problem gambling is consistent with Jacobs' theory of addiction (Gupta & Derevensky, 1998b) points to the need to examine similarities and differences among the addictions, analyze various risk and protective factors, and understand the coping mechanisms of those dealing with an addiction.

#### *Risk and Protective Factors Across Addictions*

Current prevention efforts in the fields of alcohol and drugs abuse have focused around the concepts of risk and protective factors and their interaction (Brounstein et al., 1999). These efforts seek to prevent or limit the effects of risk factors (those variables associated with a high probability of onset, greater severity, and longer duration of major mental health problems) and increase protective factors (conditions that improve an individual's resistance to risk factors and disorders). In doing so, it is believed that children will become more resilient. Children are not necessarily born resilient, for it seems that they acquire resilient qualities through the opportunities they have and particular situations to which they are exposed.

Risk factors constitute those factors that are precursors to unsuccessful coping or poor outcomes. Current etiological models emphasize complex interactions among genetic, biomedical and psychosocial risk and protective factors (Coie et al., 1993). As a result, successful risk-focused prevention programs focus upon eliminating, reducing, or minimizing risk factors associated with particular outcomes, be it problem gambling, alcohol, or drug addiction. Evidence of resiliency

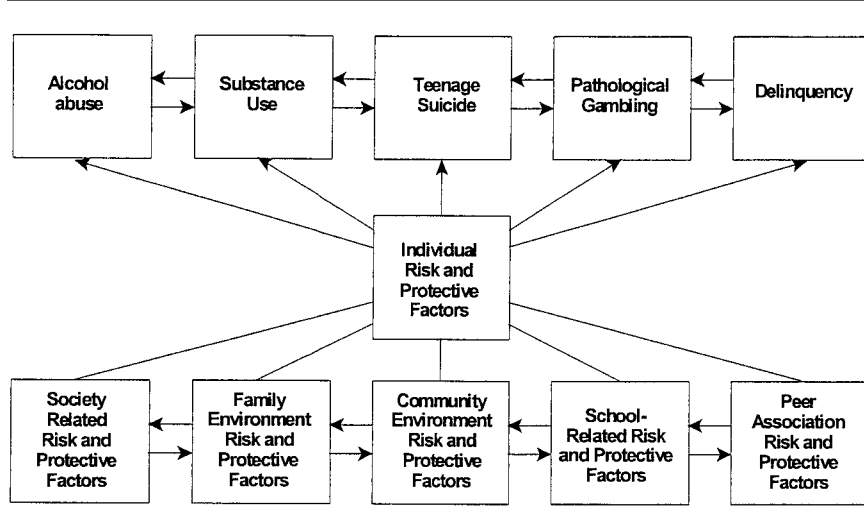
in children (e.g., Garnezy, 1985a; Rutter, 1987; Werner, 1986) has expanded the prevention field from a risk-prevention framework to one that includes both risk-prevention and the fostering of protective factors. Masten et al. (1990) suggest protective factors moderate or buffer the effects of individual vulnerabilities or environmental adversity so that the adaptational trajectory *is more positive than if the protective factors were not at work*. Protective factors do not necessarily yield resilience. If the strength or number of risk factors outweigh the impact of protective factors, the chances that poor outcomes will ensue increases. For example, positive peer group models that foster social competence and healthy behaviors may not be sufficient to buffer the effects of a verbally and emotionally abusive home environment. In this scenario, it is likely that an abusive home environment or other significant aversive problems significantly increases the likelihood of several problem behaviors, only one of which may be problem gambling.

A number of studies have examined the effects of a large number of risk and protective factors associated with excessive tobacco, alcohol, and substance abuse (see Table 1). These risk and protective factors have been grouped by the domains in which they operate. In their conceptual model, Brounstein et al. (1999) illustrate that each of these domains interact with the individual, who processes, interprets, and responds to various factors, based upon his or her own unique characteristics brought to the situation. The Center for Substance Abuse Prevention has incorporated this model, as it appears in Figure 1, as a conceptual framework for targeting high-risk groups and their potential outcomes. Protective and risk factors interact such that protective factors reduce the strength of the relation of the stressor for particular outcomes. For example, the effects of positive school experiences have been shown to moderate the effects of family conflict, which in turn decreases the association between family conflict and a number of problem behaviors (e.g., pathological gambling, alcohol and substance abuse, teenage suicide, and delinquency) (Jessor et al., 1995).

It should be noted that specific forms of dysfunction are typically associated with a number of different risk factors rather than a single factor. Similarly, a particular risk factor is rarely related to a specific disorder. Exposure to risk likely will occur in diverse ways and in numerous settings. Coie and his colleagues (1993) concluded that risk factors have complex relations to clinical disorders, the salience of risk factors may fluctuate developmentally, exposure to multiple risk fac-



**Figure 1**  
**A Conceptual Model for Understanding the Domains of Risk and Protective Factors that Influence an Individual's Behavior**



Adapted from *Understanding Substance Abuse Prevention: Toward 21st Century Primer on Effective Programs* (P. Brounstein & J. Zweig, 1999). Center for Substance Abuse Prevention (CSAP) & Substance Abuse and Mental Health Services Administration (SAMHSA).

tors appear to have cumulative effects, and diverse disorders can share similar fundamental risk factors. The risk and protective factors found in Table 1 correspond to the domains delineated by Brounstein et al.'s (1999) model.

Risk and protective factors that operate on the level of the individual include physiological factors (e.g., biochemical and genetic), personality variables, values and attitudes, early and persistent problem behaviors, and substance use. These risk and protective factors have been found to operate in the family domain through family management practices, parental modeling, familial structure (single parent homes) and family climate including conflict resolution and socio-emotional parent-child bonding. The peer domain is also particularly relevant in prevention of adolescent risk behaviors. Risk and protective factors have been found to operate through peer associations, social expectancies in regards to substance use, and through school performance. The school context also carries with it factors that impact

**Table 1**  
**Risk and Protective Factors for Adolescent Substance (Alcohol, Illicit Drugs, and Marijuana) Use and Abuse with Corresponding Prevention Findings**

| <i>Factor</i>                   | <i>Risk and Protective Factors</i>              |                   |                                                                      |                                                                                                                      | <i>Intervention</i>                                                 |              |                                                            |
|---------------------------------|-------------------------------------------------|-------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------|------------------------------------------------------------|
|                                 | <i>Mechanism</i>                                |                   | <i>Etiological Study</i>                                             | <i>Evidence (findings)</i>                                                                                           | <i>Related Interventions</i>                                        | <i>Study</i> | <i>Effects on Risk &amp; Protective Factors (findings)</i> |
|                                 | <i>Risk</i>                                     | <i>Protective</i> |                                                                      |                                                                                                                      |                                                                     |              |                                                            |
| <b>INDIVIDUAL DOMAIN</b>        |                                                 |                   |                                                                      |                                                                                                                      |                                                                     |              |                                                            |
| <i>a. Physiological Factors</i> |                                                 |                   |                                                                      |                                                                                                                      |                                                                     |              |                                                            |
| Biochemical                     | Biochemical abnormalities                       |                   | Zuckerman, 1987; Von Knorring et al., 1987; Tabakoff & Hoffman, 1988 | Sensation-seeking, early-onset alcoholism linked to platelet monoamine oxidase activity.                             | Target children with certain biochemical levels.                    |              |                                                            |
| Genetic                         | Male: increased risk for alcohol abuse          |                   | Chassin et al., 1996; Chassin et al., 1991                           | Males at increased risk for alcohol abuse.                                                                           | Implement interventions to children of alcoholics, especially boys. |              |                                                            |
|                                 | Gender of alcoholic parent: paternal alcoholism |                   | Chassin et al., 1991<br>Blum et al., 1990                            | Polymorphic pattern of dopamine D2 receptor gene suggests genetic susceptibility to at least one form of alcoholism. |                                                                     |              |                                                            |

- Loh & Ball, 2000 Human genetic association studies have suggested that the GABA-sub(A)beta2, alpha6, alpha, and gamma2, subunit genes have a role in the development of alcohol dependence, although their contributions may vary between ethnic group and phenotype.
- Noble, 2000 Studies show a strong association of the D-sub-2 receptor TaqI A minor (A1) allele with alcoholism.
- Kendler et al., 2000; Kendler et al., 1999; Maes et al., 1999; Prescott & Kendler, 1999 Twin studies indicate that heritability estimates for use, heavy use, abuse, and dependence are high. Effects are generally stronger for males than females.

---

*(continued)*

**Table 1 (Continued)**

| <i>Factor</i>                                    | <i>Risk and Protective Factors</i> |                   |                          |                                                                                                               | <i>Intervention</i>                                                                                                         |                                                  |                                                                                                                    |
|--------------------------------------------------|------------------------------------|-------------------|--------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|                                                  | <i>Mechanism</i>                   |                   | <i>Etiological Study</i> | <i>Evidence (findings)</i>                                                                                    | <i>Related Interventions</i>                                                                                                | <i>Study</i>                                     | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                         |
|                                                  | <i>Risk</i>                        | <i>Protective</i> |                          |                                                                                                               |                                                                                                                             |                                                  |                                                                                                                    |
| <i>b. Personality &amp; Predisposing Factors</i> |                                    |                   |                          |                                                                                                               |                                                                                                                             |                                                  |                                                                                                                    |
| Impulsivity                                      | Poor impulse control               |                   | Colder & Chassin, 1997   | Impulsivity moderated the effects of positive affectivity on both alcohol use and alcohol-related impairment. | Early identification of impulsivity and promoting of protective factors in children who exhibit impulsive-related problems. |                                                  |                                                                                                                    |
|                                                  |                                    |                   | Cloninger et al., 1988   | Impulsiveness in childhood predicts frequent marijuana use at age 18.                                         |                                                                                                                             |                                                  |                                                                                                                    |
| Sensation seeking                                | High Sensation-seeking             |                   | Cloninger et al., 1988   | High sensation seeking predictive of early drug initiation.                                                   | Education and life skills program targeting economically disadvantaged, high-sensation-seeking youth.                       | Clayton et al., 1991; Harrington & Donohew, 1997 | Participants evaluated the program very positively. Significant pretest differences between high and low sensation |

| Conventionality | Unconventionality | Colder & Chassin, 1999 | Moderate alcohol use reflected unconventionality. | Facilitate involvement with conventional institutions e.g. schools, community groups such as YMCA, religious institutions etc. | LoSciuto et al., 1996; Taylor, et al., 1999 | seekers were neutralized for alcohol and marijuana in both years of the program and for attitudes toward drugs in the first year. Program involving community service increased bonding to community, increased positive responses to drug-related situations, decreased use and delayed onset of initial use in adolescents. |
|-----------------|-------------------|------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                   |                        |                                                   |                                                                                                                                |                                             |                                                                                                                                                                                                                                                                                                                               |

---

*(continued)*

**Table 1 (Continued)**

| <i>Factor</i>          | <i>Risk and Protective Factors</i>          |                   |                          |                                                                                                                                                                                                                                                                            | <i>Intervention</i>                                                                                                                                        |                                       |                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------|-------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <i>Mechanism</i>                            |                   | <i>Etiological Study</i> | <i>Evidence (findings)</i>                                                                                                                                                                                                                                                 | <i>Related Interventions</i>                                                                                                                               | <i>Study</i>                          | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                                                                                                                                                                                                                                                                |
|                        | <i>Risk</i>                                 | <i>Protective</i> |                          |                                                                                                                                                                                                                                                                            |                                                                                                                                                            |                                       |                                                                                                                                                                                                                                                                                                                                                                                           |
| Emotional/Mental state | Poor psychological functioning              |                   | Colder & Chassin, 1999   | Associated with problem use of alcohol.                                                                                                                                                                                                                                    | Include addictions interventions with interventions targeted to children exhibiting emotional difficulties, mental health issues and behavioural problems. | Brounstein et al., 1999; Ficaró, 1999 | Residential prevention & treatment program that targeted adolescents with this factor in those who were economically disadvantaged and involved in the law showed dramatic reductions in alcohol, tobacco, and marijuana use and a significant number chose abstinence. Onset of initial was delayed. Remaining abstinent was found to be related to level of involvement in the program. |
|                        | Severe emotional problems/mentally disabled |                   | Colder & Chassin, 1997   | Impulsive adolescents who were also characterized by low levels of positive affectivity evidenced higher levels of alcohol use and experienced more alcohol-related impairment than did impulsive adolescents with high positive affectivity or non-impulsive adolescents. |                                                                                                                                                            |                                       |                                                                                                                                                                                                                                                                                                                                                                                           |

|                                                 |                        |                                                                                                                                                  |                                                                                |                                                                                                                                                              |                                                                                                                                                                                                                                         |
|-------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Early physical or sexual abuse during childhood | Downs & Harrison, 1998 | A positive association found between abuse and substance problems later in life even when controlling for variables such as parental alcoholism. | Target interventions to children who have or at risk for abuse.<br>Home visits | Brounstein et al., 1999; Ficaró, 1999<br><br>Berrueta-Clement et al., 1985; Johnson & Walker, 1987; Olds et al., 1988; Seitz et al., 1985                    | Positive program outcomes on youth use and delayed onset of initial use.<br>Decreased child abuse by age 2.<br>Reduced antisocial behaviour.                                                                                            |
| Trauma & aversive life events                   | Clark et al., 1997     | Mediate between temperament, genetic risk, and substance abuse disorder outcomes.                                                                | Self-esteem building as part of prevention and intervention programs.          | Fritz et al., 1995; LoSciuto et al., 1996; Miller-Heyl et al., 1998; Rogers & Taylor, 1997; Taylor et al., 1999<br><br>Brounstein et al., 1999; Ficaró, 1999 | Improvement in well-being, reactions to drug-involving situations and attitudes towards school.<br><br>Impact on decreasing substance abuse among adolescents who have experienced mental health problems, including attempted suicide. |

(continued)

**Table 1 (Continued)**

| <i>Factor</i>                | <i>Risk and Protective Factors</i> |                        |                          |                                                                                                                                                                   | <i>Intervention</i>                                                                                                                                                              |                                            |                                                                                                                                                                                                                                                                    |
|------------------------------|------------------------------------|------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | <i>Mechanism</i>                   |                        | <i>Etiological Study</i> | <i>Evidence (findings)</i>                                                                                                                                        | <i>Related Interventions</i>                                                                                                                                                     | <i>Study</i>                               | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                                                                                                                                         |
|                              | <i>Risk</i>                        | <i>Protective</i>      |                          |                                                                                                                                                                   |                                                                                                                                                                                  |                                            |                                                                                                                                                                                                                                                                    |
|                              |                                    | Social competence      |                          |                                                                                                                                                                   | Life skills/social skills training (e.g. role playing, classroom assignments).                                                                                                   | Botvin et al., 1995; Tremblay et al., 1994 | Decreased levels of tobacco, alcohol, and marijuana use. Better school adjustment.                                                                                                                                                                                 |
| Ethnic and cultural identity | De-valuing of ethnic identity      | Strong ethnic identity | Brook et al., 1998       | Each of the components of ethnic identity offset risks or enhanced protective factors from the ecology, family, personality, and peer domains lessening drug use. | Target interventions to immigrant families and at-risk cultural groups.<br><br>Assist families in acculturation; ensure community supports are in place; affirm ethnic identity. | Hernandez & Lucero, 1996                   | Student showed gains in personal, social, ethical attitudes, values and motives; decreases in drug use and delayed onset of initial use. Families became more willing to discuss substance use and abuse issues openly and make positive steps toward empowerment. |



|                                  |                 |                        |                                                                                                                                              |                                                                                       |                                                                                                                                                                                                                                                                                        |
|----------------------------------|-----------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |                 | Brook et al., 1998     | Cultural knowledge, being culturally active, group attachment, and identification with Puerto Ricans offset the impact of risks on drug use. | Brounstein et al., 1999                                                               |                                                                                                                                                                                                                                                                                        |
| <i>c. Values &amp; Attitudes</i> | Low religiosity | Brunswick et al., 1982 |                                                                                                                                              |                                                                                       | Pettit et al., 1997; Solomon et al., 2000                                                                                                                                                                                                                                              |
|                                  |                 |                        |                                                                                                                                              | Group interventions aimed at the development of self-regulation of problem behaviour. | Dishion et al., 1996                                                                                                                                                                                                                                                                   |
|                                  |                 |                        |                                                                                                                                              |                                                                                       | LoSciuto et al., 1996; Rogers & Taylor, 1997; Taylor et al., 1999                                                                                                                                                                                                                      |
|                                  |                 |                        |                                                                                                                                              |                                                                                       | Student showed gains in personal, social, and ethical attitudes, values and motives.<br>Decreases in problem behaviour.<br>Mentoring program targeting 11 to 13 year olds did not lead to significant positive changes in alcohol, tobacco, and drug knowledge, values, and attitudes. |

---

*(continued)*

**Table 1** (*Continued*)

| <i>Factor</i>                                      | <i>Risk and Protective Factors</i>                           |                     |                                                                                                                  |                                                                       | <i>Intervention</i>                                                                          |                                                |                                                                                                               |
|----------------------------------------------------|--------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
|                                                    | <i>Mechanism</i>                                             |                     | <i>Etiological Study</i>                                                                                         | <i>Evidence (findings)</i>                                            | <i>Related Interventions</i>                                                                 | <i>Study</i>                                   | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                    |
|                                                    | <i>Risk</i>                                                  | <i>Protective</i>   |                                                                                                                  |                                                                       |                                                                                              |                                                |                                                                                                               |
|                                                    |                                                              | Anti-drug attitudes | Zastowny et al., 1993                                                                                            | A strong predictor of adolescent healthy substance use.               | A 'values-rich' literature-based reading & language arts program.                            | Battistich et al., 1996; Solomon, et al., 2000 | Successful in decreasing substance abuse prevalence rates and increasing students' sense of school community. |
| <i>d. Early &amp; Persistent Problem Behaviors</i> | Early conduct problems in multiple settings                  |                     | Younoszai et al., 1999                                                                                           | Increases likelihood for later substance use.                         | Early intervention with children with problem behaviors.                                     |                                                |                                                                                                               |
|                                                    | Persistent delinquency & internalizing problems in childhood |                     | Block et al., 1988; Brook et al., 1990; Lynskey & Fergusson, 1995; Sullivan & Farrell, 1999; Tarter et al., 1999 |                                                                       | Intervention strategies include social competence training for children and parent training. |                                                |                                                                                                               |
|                                                    |                                                              |                     | Loeber et al., 1999                                                                                              | Associated with persistent juvenile substance use between 7–18 years. |                                                                                              |                                                |                                                                                                               |

*e. Substance Use*

|                              |                             |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                    |                                                                                                                                                                                                 |                                                                                                                                                                     |
|------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Delayed onset of initial use | Grant & Dawson, 1997, 1998. | Each year of delayed alcohol use decreased the odds of life-long dependence and lifelong use.                                                                                                                                                                                                                                            | Establish prevention programs encouraging healthy attitudes and drug education before initiation of substance use. | Brounstein et al., 1999; Dumas et al., 1999; Ficaró, 1999; Johnson et al., 1996; LoSciuto et al., 1996; Metz, 1995; Miller-Heyl et al., 1998; St Pierre et al., 1992, 1997; Taylor et al., 1999 | Several programs have successfully increased the latency of first tobacco, alcohol, and drug use as well as contributing to reduced alcohol, tobacco, and drug use. |
|                              | Hawkins et al., 1997        | Younger age of alcohol initiation was strongly related to higher levels of alcohol misuse at age 17–18 and mediated the effects of parent drinking, proactive parenting, school bonding, peer alcohol initiation and ethnicity, all measured at age 10–11, and perceived harmfulness of alcohol use measured at age 10–11 and age 11–12. |                                                                                                                    |                                                                                                                                                                                                 |                                                                                                                                                                     |

---

*(continued)*

**Table 1** (*Continued*)

| <i>Factor</i>                         | <i>Risk and Protective Factors</i>     |                           |                                            |                                                                                                                      | <i>Intervention</i>                                                                                      |                                                                                                                      |                                                            |
|---------------------------------------|----------------------------------------|---------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
|                                       | <i>Mechanism</i>                       |                           | <i>Etiological Study</i>                   | <i>Evidence (findings)</i>                                                                                           | <i>Related Interventions</i>                                                                             | <i>Study</i>                                                                                                         | <i>Effects on Risk &amp; Protective Factors (findings)</i> |
|                                       | <i>Risk</i>                            | <i>Protective</i>         |                                            |                                                                                                                      |                                                                                                          |                                                                                                                      |                                                            |
|                                       |                                        | Late onset of drunkenness | Thomas et al., 2000                        | Later onset diminished future levels of alcohol misuse and sexual risk taking.                                       |                                                                                                          |                                                                                                                      |                                                            |
|                                       | Early initiation (prior to 15–16 yrs). |                           | Dishion et al., 1999; Fleming et al., 1982 | The earlier the initiation, the greater the frequency of usage effects found for alcohol, marijuana, and cigarettes. |                                                                                                          |                                                                                                                      |                                                            |
|                                       | Prior drug use                         |                           | Sullivan & Farrell, 1999                   | Predicts substance abuse.                                                                                            |                                                                                                          |                                                                                                                      |                                                            |
| <b>FAMILY DOMAIN</b>                  |                                        |                           |                                            |                                                                                                                      |                                                                                                          |                                                                                                                      |                                                            |
| <i>a. Family Management Practices</i> | Poor family management practices       |                           | Baumrind, 1983; Chassin et al., 1996       | Data consistent with father's monitoring and stress as possible mediators of paternal alcoholism effects;            | Facilitate social support by providing family support groups; teach family management skills to parents. | Dishion et al., 1996; Pentz et al., 1990; St. Pierre et al., 1997; St. Pierre & Kaltreider, 1997; Werch et al., 2000 |                                                            |

|                                                                                                    |                                           |                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                       |                                                                      |                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                    |                                           | nondirectiveness, and permissiveness related to children's drug use.                                                                                                                   |                                                                                                                                                                                                                                                                                       |                                                                      |                                                                                                                                                                                                                                                                                                          |
|                                                                                                    | Peterson et al. 1994; Windle et al., 1996 | Failure to monitor children; inconsistent parenting practices and/or harsh discipline.                                                                                                 | School-based prevention program incorporating home activities whereby children complete activities with their families relevant to what students learn in school.                                                                                                                     | Battistich, et al., 1996; Pettit, et al., 1997; Solomon et al., 2000 | No measure of increased family functioning taken.                                                                                                                                                                                                                                                        |
|                                                                                                    | Reilly, 1979                              | Families of adolescent drug users exhibit common characteristics of negative communication patterns, unrealistic parental expectations, and unclear and inconsistent behaviour limits. | Target uninvolvement, distanced parents, single-parent households. Programs that provide education and supportive activities to help families cope with daily life or specific crises; educational activities and leadership activities in which parents assume a major role in plan- | St. Pierre et al., 1997; St. Pierre & Kaltreider, 1997               | Youth demonstrated prosocial changes in their attitudes and their perceived ability to refuse drugs and alcohol. No significant effects on social skills, attitudes toward alcohol and cigarettes and substance abuse behaviours. Lack of effects may be attributable to low base-line of substance use. |
| Family management practices that strengthen bonding, problem-solving skills and social competence. | Baumrind, 1983                            | Parent authoritativeness related to children's prosocial, assertive behaviours.                                                                                                        |                                                                                                                                                                                                                                                                                       |                                                                      |                                                                                                                                                                                                                                                                                                          |

(continued)

**Table 1 (Continued)**

| Factor                                                               | Risk and Protective Factors       |                     |                         |                                                               | Intervention                                                                                                                                                                       |                                                         |                                                                                                                                                                                       |
|----------------------------------------------------------------------|-----------------------------------|---------------------|-------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                      | Mechanism                         |                     | Etiological Study       | Evidence (findings)                                           | Related Interventions                                                                                                                                                              | Study                                                   | Effects on Risk & Protective Factors (findings)                                                                                                                                       |
|                                                                      | Risk                              | Protective          |                         |                                                               |                                                                                                                                                                                    |                                                         |                                                                                                                                                                                       |
| b. Family Drug Abuse Behaviour and Involvement in Illicit Activities | Family history of substance abuse | Parental monitoring | Thomas et al., 2000     | Parental monitoring mitigated later levels of alcohol misuse. | ning and implementing.                                                                                                                                                             |                                                         |                                                                                                                                                                                       |
|                                                                      |                                   |                     | Merikangas et al., 1998 | A powerful predictor of substance abuse                       | Institutional placement with multiple interventions.                                                                                                                               | Brounstein et al., 1999; Ficaró, 1999                   | Residential intervention and prevention program involving distancing from drug using parents significantly decreased drug and alcohol use and delayed onset of initial substance use. |
|                                                                      |                                   |                     |                         |                                                               | Target interventions to children whose siblings or parents are users/abusers and involved in illicit activities.<br>Hold family-oriented social activities for high-risk families. | Horn, 1998; Johnson et al., 1996; Strader et al., 2000. | Community-based approach to prevention and intervention that targeted teens who had substance abuse in their family successfully decreased substance use.                             |

|                                                                                                                                                                                        |                                                         |                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Train high-risk parents in relevant alcohol and drug issues.                                                                                                                           | Horn, 1998; Johnson, et al., 1996; Strader et al., 2000 | Parents sustained gains in level of knowledge and beliefs about drugs and alcohol.                                                                                                                                           |
| Teach high-risk parents family management, including improving communication about, setting expectations for, and defining consequences for youth alcohol- and drug-related behaviour. | Johnson et al., 1996; Strader et al., 2000              | Parents reported short-term improvements in communication with their children. However, these perceived gains were not corroborated by youth. Positive family communication mediated parental maternal and paternal bonding. |
|                                                                                                                                                                                        | Kumpfe et al., 1996                                     | Increased parental self-efficacy, monitoring, and parent discipline.                                                                                                                                                         |
|                                                                                                                                                                                        | Kazdin et al., 1992                                     | Reduced parental stress.                                                                                                                                                                                                     |
|                                                                                                                                                                                        | Dishion et al., 1992                                    | Reduced parental negative discipline.                                                                                                                                                                                        |

---

*(continued)*

**Table 1 (Continued)**

| <i>Factor</i> | <i>Risk and Protective Factors</i>                                                                |                                     |                                              |                                                                                                                     | <i>Intervention</i>                                                                                                                                                    |                                                                                          |                                                                                                                                                                                                                                |
|---------------|---------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <i>Mechanism</i>                                                                                  |                                     | <i>Etiological Study</i>                     | <i>Evidence (findings)</i>                                                                                          | <i>Related Interventions</i>                                                                                                                                           | <i>Study</i>                                                                             | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                                                                                                     |
|               | <i>Risk</i>                                                                                       | <i>Protective</i>                   |                                              |                                                                                                                     |                                                                                                                                                                        |                                                                                          |                                                                                                                                                                                                                                |
|               | Number of members abusing substances in a household                                               |                                     | Ahmed et al., 1984                           | Increases children's use and intentions to use abusable substances.                                                 | Distancing from chemically dependent parents and providing healthy adult models.                                                                                       | Fritz et al., 1995; LoSciuto et al., 1996; Miller-Heyl et al., 1998; Taylor et al., 1999 |                                                                                                                                                                                                                                |
|               | Involving children in parental alcohol or drug-using behaviors (e.g. getting a beer for a parent) | No models for problem substance use | Ahmed et al., 1984; Sullivan & Farrell, 1999 | Modeling of problem substance use increases likelihood of children's use and intentions to use abusable substances. | Providing individual and motivational counselling to increase teens' awareness of the effects of parents' behaviour, motivating adolescents to join counseling groups. | Brounstein et al., 1999; Kumpfer et al., 1996                                            | A residential intervention program found that 72.2-, 58.5-, and 26.9 percent reported no longer using alcohol, marijuana, and tobacco, respectively. Remaining abstinent was related to level of participation in the program. |



Deviant behavior  
among family  
members

Nurco et al., 1996

Increases likeli-  
hood of nar-  
cotic addiction.

Group counsel-  
ing with the  
aims of correct-  
ing mispercep-  
tions about  
normative sub-  
stance use and  
better under-  
standing of par-  
ents' substance  
use.

Brounstein et al.,  
1999  
St. Pierre et al.,  
1992; St. Pierre  
et al., 1997

-see above

Community-based  
program that  
increased  
knowledge  
about alcohol,  
tobacco, & il-  
licit drugs and  
decreased fa-  
vorable atti-  
tudes toward  
marijuana. Par-  
ticipants had  
significant de-  
creases in mari-  
juana and  
tobacco use  
and marginally  
significant de-  
creases in alco-  
hol use over  
time.

Educational dis-  
cussion groups:  
focus on issues  
of adolescence,  
attitudes, and  
feelings con-  
cerning sub-  
stance use.

Brounstein et al.,  
1999

-see above

Drug education  
with multiyear  
booster ses-  
sions.

Botvin et al.,  
1995; Ellickson  
et al., 1993; St.  
Pierre et al.,  
1992; St. Pierre  
et al., 1997

Decreased use of  
alcohol, to-  
bacco, and  
marijuana.

---

(continued)

**Table 1 (Continued)**

| <i>Factor</i>            | <i>Risk and Protective Factors</i> |                   |                                                                                           |                                                                                                                                       | <i>Intervention</i>                                                                                                                                                                                                                                                                         |                                              |                                                                                                                                                                                                                                                                                       |
|--------------------------|------------------------------------|-------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | <i>Mechanism</i>                   |                   | <i>Etiological Study</i>                                                                  | <i>Evidence (findings)</i>                                                                                                            | <i>Related Interventions</i>                                                                                                                                                                                                                                                                | <i>Study</i>                                 | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                                                                                                                                                            |
|                          | <i>Risk</i>                        | <i>Protective</i> |                                                                                           |                                                                                                                                       |                                                                                                                                                                                                                                                                                             |                                              |                                                                                                                                                                                                                                                                                       |
| <i>c. Family Climate</i> | Family conflict and disruption     |                   | Brook et al., 1992<br><br>Colder & Chassin, 1999; Nurco et al., 1996; Needle et al., 1990 | Buffer teens from negative peer influences and drug availability.<br><br>High family conflict is associated with problem alcohol use. | Provide support groups for children experiencing family stresses such as divorce, conflict, and death. Programs that involve parent-child activities that emphasize skills building and establishing peer support, social/meal times.<br><br>Annual parental skill reinforcement workshops. | Fritz et al., 1995; Miller-Heyl et al., 1998 | A program that target families with preschoolers increased parental sense of competence, use of nurturing family management strategies, appropriate monitoring techniques, and decreased use of harsh punishment. Children exhibited increases in communication, problem-solving, and |

|                                 |                             |                                                                                                                                                          |                                                                                                        |                                                                                                                                                                                                                                                                            |
|---------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                             |                                                                                                                                                          |                                                                                                        | reasoning skills<br>in comparison<br>to control<br>group peers.<br>Program success<br>was greatly due<br>to the positive<br>changes on one<br>key risk factor<br>for early onset<br>of and sus-<br>tained sub-<br>stance use:<br>dysfunctional<br>family environ-<br>ment. |
| Parental attitudes              | Barnes & Welte,<br>1986     | Permissive paren-<br>tal attitudes to-<br>ward children's<br>drug use pre-<br>dicted alcohol<br>use among 7 <sup>th</sup> -<br>12 <sup>th</sup> graders. | Fostering of<br>health-wise atti-<br>tudes in young<br>children in<br>school preven-<br>tion programs. |                                                                                                                                                                                                                                                                            |
| Perceived paren-<br>tal support | Frauenglass et al.,<br>1997 | High levels of<br>perceived social<br>support from<br>family is nega-<br>tively associated<br>with drug use<br>among His-<br>panic adoles-<br>cents.     |                                                                                                        |                                                                                                                                                                                                                                                                            |

---

*(continued)*

**Table 1 (Continued)**

| <i>Factor</i>              | <i>Risk and Protective Factors</i> |                                                             |                                                             |                                                                                                                                                                    | <i>Intervention</i>                                  |                                                                                                                                                                                                         |                                                                                                                                                                                                         |
|----------------------------|------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | <i>Mechanism</i>                   |                                                             | <i>Etiological Study</i>                                    | <i>Evidence (findings)</i>                                                                                                                                         | <i>Related Interventions</i>                         | <i>Study</i>                                                                                                                                                                                            | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                                                                              |
|                            | <i>Risk</i>                        | <i>Protective</i>                                           |                                                             |                                                                                                                                                                    |                                                      |                                                                                                                                                                                                         |                                                                                                                                                                                                         |
| <i>d. Structure</i>        | Single parent structure            | Parental expectations                                       | Sullivan & Farrell, 1999<br><br>Thomas et al., 2000.        | Positive parental expectations for academic achievement a buffer for risk factors.<br><br>Indirectly related to greater alcohol misuse through lowered monitoring. | Encourage positive community and school involvement. | Fritz et al., 1995; LoScuito et al., 1996; Miller-Heyl et al., 1998; Taylor et al., 1999                                                                                                                | Mentoring programs have been successful for adolescents in decreasing drug use and delaying onset of initial use.                                                                                       |
| <i>e. Bonding/Cohesion</i> |                                    | Strong parental bonding; perceived caring and connectedness | Bell et al., 2000; Brook et al., 1986; Resnick et al., 1997 |                                                                                                                                                                    | Strengthen family bonding.                           | Brounstein et al., 1999; Dumas et al., 1999; Ficaro, 1999; Johnson et al., 1996; LoSciuto et al., 1996; Miller-Heyl et al., 1998; St. Pierre et al., 1997; St. Pierre et al., 1992; Taylor et al., 1999 | Several programs have promoted supportive and caring relationships between youth and family members, which has contributed to either delayed initial substance initiation or decreased substance abuse. |

|                    |                                                                                                         |                                                                                                                                                    |                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                |
|--------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spath et al., 1996 | Bonds are viewed as reflecting the adolescent's adoption of conventional societal attitudes and values. | Establish mentoring with an older adolescent or adult.                                                                                             | Fritz et al., 1995; LoSciuto et al., 1996; Miller-Heyl et al., 1998; Rogers & Taylor, 1997; Tierney et al., 1995; Taylor et al., 1999 | Prevention and intervention programs in schools that provided mentoring found decreases in substance use, delayed onset of initial use, significant improvement in well-being, greater commitment to community and school and an increase in positive attitudes towards elders; buffered against the risk of having substance-abusing parents. |
|                    | Parental attachment strongly related to young adolescent alcohol refusal skills.                        | Involve family members in community program activities with their children to strengthen family bonds and develop more effective parenting styles. | LoSciuto et al., 1996; Taylor et al., 1999                                                                                            | School-implemented program that involved parents did not indicate increases in family bonding or effective parenting styles.                                                                                                                                                                                                                   |

(continued)

**Table 1 (Continued)**

| <i>Factor</i>                   | <i>Risk and Protective Factors</i> |                   |                          |                                                                                                                                                                                                                  | <i>Intervention</i>                                                                                          |                                                                                                                        | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                        |
|---------------------------------|------------------------------------|-------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <i>Mechanism</i>                   |                   | <i>Etiological Study</i> | <i>Evidence (findings)</i>                                                                                                                                                                                       | <i>Related Interventions</i>                                                                                 | <i>Study</i>                                                                                                           |                                                                                                                                                   |
|                                 | <i>Risk</i>                        | <i>Protective</i> |                          |                                                                                                                                                                                                                  |                                                                                                              |                                                                                                                        |                                                                                                                                                   |
| PEER DOMAIN<br>Peer Association | Expectations of social benefit     |                   | Kline, 1996              |                                                                                                                                                                                                                  | Substance and addictions education.                                                                          | Metz, 1995; Miller-Heyl et al., 1998; St. Pierre et al., 1997; St. Pierre et al., 1992; Taylor et al., 1999            | Several studies indicate the effectiveness of programs that incorporate the goal of increasing adolescent drug knowledge.                         |
|                                 | Social alcohol expectancies        |                   |                          | Predicted alcohol consequences beyond pre-existing alcohol consumption, and parental alcoholism.<br>Protective factor for physical & emotional health, violence, substance use, and sexuality in grades 7 to 12. | Teach students personal and social skills, emphasizing how to reduce peer pressure to experiment with drugs. | Brounstein et al., 1999; LoSciuto et al, 1996; Taylor et al., 1999<br>St. Pierre et al., 1992; St. Pierre et al., 1997 | Adolescents showed significant decreases in use of drugs, marijuana, and cigarettes, and marginally significant decreases in alcoholic behaviour. |

|                                  |                                               |                                                                                                                                |                                                                                      |                                                 |                                                                                                                                                                                                      |
|----------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reinforcement by drug-using peer | Association with peers having prosocial norms | Increases risk for use of cigarettes, alcohol, and marijuana.                                                                  | Teaching social pressures resistance skills.                                         | Shope et al., 1998                              | Prevention curriculum implemented in grades 6 & 7. Students received lessons on alcohol, tobacco, marijuana, & cocaine. Significant effects evident at grade 7 were not maintained through grade 12. |
|                                  |                                               | Peer substance use behaviour predicts substance use and peer norms predict adolescent substance misuse.                        | Curriculum-based program promoting conservative group norms regarding substance use. | St. Pierre et al., 1992; St. Pierre et al, 1997 | Participants came to perceive fewer social benefits from smoking marijuana and drinking alcohol after 15- and 27-month posttests.                                                                    |
|                                  |                                               | Ferrell et al., 1992; Hansen & Graham, 1991; Jenkins, 1987; Resnick et al., 1997; Sullivan & Farrell, 1999; Spoth et al., 1996 | Protective factor on adolescent alcohol refusal skills.                              |                                                 |                                                                                                                                                                                                      |

(continued)

**Table 1 (Continued)**

| <i>Factor</i>        | <i>Risk and Protective Factors</i> |                                     |                                                                                                |                                                                                                              | <i>Intervention</i>                                                            |                                                                                                                                                            |                                                                                     |
|----------------------|------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      | <i>Mechanism</i>                   |                                     | <i>Etiological Study</i>                                                                       | <i>Evidence (findings)</i>                                                                                   | <i>Related Interventions</i>                                                   | <i>Study</i>                                                                                                                                               | <i>Effects on Risk &amp; Protective Factors (findings)</i>                          |
|                      | <i>Risk</i>                        | <i>Protective</i>                   |                                                                                                |                                                                                                              |                                                                                |                                                                                                                                                            |                                                                                     |
| <b>SCHOOL DOMAIN</b> |                                    |                                     |                                                                                                |                                                                                                              |                                                                                |                                                                                                                                                            |                                                                                     |
| <i>Performance</i>   | Poor school performance            | Adaptive school functioning         | Bachman et al., 1991; Hundleby & Mercer, 1987; Kandel & Davies, 1986; Sullivan & Farrell, 1999 | Predictive of early substance initiation; mitigates escalation of substance use.                             | Promote academic achievement in a number of ways.                              | Battistich et al., 1996; Johnson et al., 1996; LoSciuto et al., 1996; Pettit et al., 1997; Solomon et al., 2000; Strader et al., 2000; Taylor et al., 1999 | Programs affected student's academic self-esteem. No measures of performance taken. |
|                      |                                    |                                     |                                                                                                | School responsiveness to student needs is related to reduced substance use.                                  | Peer tutors and use of school for after-hours enrichment and parent education. | Eggert et al., 1994; Gottfredson, 1986; Kumpfer et al., 1991                                                                                               | Decreased substance abuse & delinquency and improved grades.                        |
| <i>Bonding</i>       |                                    | Perceived connectedness with school | Resnick et al., 1997                                                                           | Protective factor for physical & emotional health, violence, substance use, and sexuality in grades 7 to 12. |                                                                                |                                                                                                                                                            |                                                                                     |



|                      |                                           |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                          |                                                                                                                                                                                                                                           |
|----------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Positive involvement | Jenkins, 1987;<br>Resnick et al.,<br>1997 | Attachment and involvement in school, attendance and extracurricular activities protect against substance abuse. | Promote attendance and involvement by increased parental involvement and changes in classroom management style.<br>Educate and support teachers' values of mental health and relationships at peer-teacher relations at school.<br>Program incorporating the training of school staffs in revised teaching practices that include cooperative learning activities and improving understanding of interpersonal relationships. | Hawkins et al.,<br>1992                                                  | Improved academic skills, increased commitment to school and decreased incidents of drug use in school.<br>Improved teacher practices led to positive changes in classroom behaviours which were related to students' sense of community. |
|                      |                                           |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                               | Battistich et al.,<br>1996; Pettit et al., 1997; Solomon et al.,<br>2000 |                                                                                                                                                                                                                                           |
|                      |                                           |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                               | Fritz et al, 1995;<br>Miller-Heyl et al., 1998                           | Similar results as those for middle school and adolescents were indicated.                                                                                                                                                                |

(continued)

**Table 1 (Continued)**

| <i>Factor</i> | <i>Risk and Protective Factors</i> |                   |                          |                            | <i>Intervention</i>                                                                                                                                                                                                                      |                                                                           | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                                                                                                                                                                      |
|---------------|------------------------------------|-------------------|--------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <i>Mechanism</i>                   |                   | <i>Etiological Study</i> | <i>Evidence (findings)</i> | <i>Related Interventions</i>                                                                                                                                                                                                             | <i>Study</i>                                                              |                                                                                                                                                                                                                                                                                                 |
|               | <i>Risk</i>                        | <i>Protective</i> |                          |                            |                                                                                                                                                                                                                                          |                                                                           |                                                                                                                                                                                                                                                                                                 |
|               |                                    |                   |                          |                            | <p>A teaching and problem-solving approach to discipline and classroom management. Students have regular opportunities to contribute.</p> <p>Implement school-wide cross-grade buddy programs and other student services activities.</p> | <p>Battistich et al., 1996; Pettit et al., 1997; Solomon et al., 2000</p> | <p>Students report having a stronger sense of community in their school which was associated with a large number of outcomes, including preventative effects on alcohol and marijuana and marginal effects on tobacco use.</p> <p>Students also reported increases in academic self-esteem.</p> |

|                                    |                                                          |                                                |                                                                                                                                                                                                                               |                                                                                                                                                   |                                            |                                                                                                                                                                                     |
|------------------------------------|----------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| School policy                      | Absence of school policies enforcing anti-drug behaviour | Felner, 1993                                   | Those that discourage substance use and related behaviours are associated with improved teacher practices and positive student outcomes.                                                                                      |                                                                                                                                                   | DiCicco et al., 1984; Gofferson, 1986      | Increased use of treatment facilities by students and staff who participated in the workshops more likely to talk to students regarding substance issues and refer others for help. |
| COMMUNITY DOMAIN                   |                                                          |                                                |                                                                                                                                                                                                                               |                                                                                                                                                   |                                            |                                                                                                                                                                                     |
| Access & availability to substance | Increased availability                                   | Brook et al., 1992                             |                                                                                                                                                                                                                               | Raise taxes on alcohol.                                                                                                                           | Coate & Grossman, 1988                     | Higher alcohol taxes found to be related to decreases in consumption and problem drinking consequences.                                                                             |
| Resources                          | Disorganized neighborhoods                               | Brook et al., 1990; Fagan, 1988; Sampson, 1986 | High population density, high residential mobility, physical deterioration and low levels of neighborhood cohesion or attachment face greater risk for a range of behavior problems including alcohol and illicit drug abuse. | Offer community service activities so that teens can provide services to others and become involved in constructive activities outside of school. | Johnson et al., 1996; Strader et al., 2000 | A community based intervention program indicated that the level of community involvement mediated child-parent bonding and sustained reduction in alcohol abuse.                    |

(continued)

**Table 1 (Continued)**

| <i>Factor</i> | <i>Risk and Protective Factors</i> |                                   |                          |                                                                                                                                                                     | <i>Intervention</i>                                                                                                                                                                |                                                                          |                                                                                                                                                      |
|---------------|------------------------------------|-----------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | <i>Mechanism</i>                   |                                   | <i>Etiological Study</i> | <i>Evidence (findings)</i>                                                                                                                                          | <i>Related Interventions</i>                                                                                                                                                       | <i>Study</i>                                                             | <i>Effects on Risk &amp; Protective Factors (findings)</i>                                                                                           |
|               | <i>Risk</i>                        | <i>Protective</i>                 |                          |                                                                                                                                                                     |                                                                                                                                                                                    |                                                                          |                                                                                                                                                      |
|               |                                    | Participation in organized groups | Elder et al., 2000       | Participation in community groups contributes to the development of leadership, sense of community, helping other, and provides alternative activities to drug use. | Establishment of supervised youth recreational/cultural programs.                                                                                                                  | Schinke et al., 1992<br><br>Jones & Offord, 1989<br>Schinke et al., 1992 | Decreased vandalized housing units and reduced drug use.<br><br>Reduced juvenile arrests.<br>Reduced delinquency.                                    |
|               |                                    |                                   |                          |                                                                                                                                                                     | Print media to support community organizing and youth action initiatives and communicate healthy norms about underage drinking (e.g. providing alcohol to minors is unacceptable). | Perry et al., 2000                                                       | Although final results of the final phase of the comprehensive program are not yet available, students in the intervention group were drinking less. |

SOCIETY/ENVIRONMENTAL DOMAIN

|                             |                                                   |                                                                  |                                                                                                                                                                        |                                                                                                                                     |                        |                                                                       |
|-----------------------------|---------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------|
| Access: retail prices; laws | Absence of legal enforcement of underage drinking | Maddahian et al., 1988; Gottfredson, 1988; Laughery et al., 1993 | Availability affected use of alcohol and illegal drugs.                                                                                                                | Increased taxes on alcohol and tobacco.                                                                                             | Coate & Grossman, 1988 | Increased beer prices reduce frequent youth drinking.                 |
| Norms: mass media messages  | Drinking as an acceptable social behaviour        | Colder & Chassin, 1999; Johston et al., 1991; Atkin et al., 1984 | Socialization specific to alcohol related to moderate alcohol use.<br>More exposure to media campaigns promoting alcohol among teens reporting higher drinking levels. | Prevention strategies need to foster norms opposing drug use. Public ads warning of dangers of drug use and other risky behaviours. | Palmgreen et al., 1995 | Sensation-targeted ads reduced participation in high-risk behaviours. |
|                             | Intolerant attitudes toward deviance              | Jessor, 1993                                                     | Draw adolescents into more conventional behaviors associated with school, church or the community and protect against substance abuse.                                 |                                                                                                                                     |                        |                                                                       |

---

This chart summarizes the risk and protective factors, and prevention initiatives for alcohol and drug use. See Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. (1999). *Preventing problems related to alcohol availability: Environmental approaches practitioners' guide Third in the PEPS Series*. Rockville, MD: Substance Abuse and Mental Health Services Administration, DHHS Publication No. (SMA) 99-3398.) for a summary of specific smoking prevention initiatives.

---

upon an adolescent's attitudes and behaviour. Academic performance, school bonding (perceived connectedness with school) and school policies have also been found to either buffer risk factors of substance abuse or are precursors to unsuccessful coping and the development of substance abuse. On the community level, risk and protective factors impact adolescent risk behavior via accessibility to substances, and the broadest level of societal environment, laws and attitude norms (those portrayed in the media must also be acknowledged as playing a significant role in adolescent substance use and abuse outcomes).

It needs to be noted that the studies presented identifying the protective mechanisms displayed in Table 1 do not differentiate between protective factors delineated by examining their interaction effects with risk factors, and those protective factors that may be more accurately defined as resources factors (Hammen, 1992). Resource factors similarly contribute to positive outcomes, independent of one's risk status and are identified by examining main effects with a targeted outcome variable. Both interaction and main effect factors have been shown to contribute to one's resilience and need to be considered in the design of effective prevention programs. Another interpretative caution of Table 1 is that several studies of risk factors do not differentiate between being at-risk for substance *use* and being at-risk for substance *abuse*, despite the delineation of prior substance use as a risk factor for substance abuse (Glantz, Weinberg, Miner & Colliver, 1999; Sullivan & Farrell, 1999; Tarter, Vanyukov, Giancola, Dawes, Blackson, Mezzich, & Clark, 1999) and conceptual differentiation between normal experimentation and abuse (Jessor, 1987; Shedler & Block, 1990).

In an attempt to conceptualize our current state of knowledge concerning the risk factors associated with problem gambling, a similar paradigm was created (see Table 2) based upon our current knowledge of youth with severe gambling problems. Within in the individual domain, poor impulse control, high sensation-seeking, unconventionality, poor psychological functioning, low self-esteem, early and persistent problem behaviors and early initiation are commonly found. Common risk factors in the family domain include a family history of substance abuse, parental attitudes, and modeling of deviant behavior. Within the peer domain, social expectancies and reinforcement by peer groups are common risk factors across addictions. School difficulties, access to substance or problem activity, and societal norms are

**Table 2**  
**Risk Factors and Correlates of Adolescent Problem Gambling with Corresponding Prevention Findings**

| <i>Risk</i>                          |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                   | <i>Intervention</i> |              |                                                        |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|--------------------------------------------------------|
| <i>Risk Factor/Correlate</i>         | <i>Study</i>                                                                                                                                                                                                                     | <i>Evidence (findings)</i>                                                                                                                                                                                        | <i>Implications</i> | <i>Study</i> | <i>Effects on Risk Factor or Use/ Abuse (findings)</i> |
| 1. Physiological Factors             |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                   |                     |              |                                                        |
| (a) Biochemical                      | Gupta & Derevensky, 1998a                                                                                                                                                                                                        | Increased physiological resting state; increased sensation seeking. More likely to be excited and aroused during gambling                                                                                         |                     |              |                                                        |
| (b) Genetics                         | Blum et al., 1997                                                                                                                                                                                                                | 51% of problem gamblers had DR02 gene                                                                                                                                                                             |                     |              |                                                        |
| (c) Gender                           | Derevensky, Gupta & Della Cioppa, 1996; Govoni, et al., 1996; Griffiths, 1989; Gupta & Derevensky, 1998a; Jacobs, 2000; Ladouceur et al., 1994; Stinchfield, 2000; Volberg, 1994, 1996, 1998; Wallisch, 1993; Wynne et al., 1996 | Gambling is more popular amongst males than females. Males are more likely to gamble and gamble more frequently. Females prefer scratch tickets and lotteries whereas males prefer sports betting and card games. |                     |              |                                                        |
| 2. Personality Factors               |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                   |                     |              |                                                        |
| (a) Low conformity & self discipline | Gupta & Derevensky, 1997b; Taber et al., 1986                                                                                                                                                                                    |                                                                                                                                                                                                                   |                     |              |                                                        |

*(continued)*

**Table 2 (Continued)**

| <i>Risk</i>                  |                                                                                                       |                                                                                         | <i>Intervention</i>                                                          |              |                                                        |
|------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------|--------------------------------------------------------|
| <i>Risk Factor/Correlate</i> | <i>Study</i>                                                                                          | <i>Evidence (findings)</i>                                                              | <i>Implications</i>                                                          | <i>Study</i> | <i>Effects on Risk Factor or Use/ Abuse (findings)</i> |
| (b) High impulsivity         | Gupta & Derevensky, 1997b; Zimmerman et al., 1985                                                     |                                                                                         |                                                                              |              |                                                        |
| (c) High extroversion        | Gupta & Derevensky, 1997b, 1998                                                                       |                                                                                         |                                                                              |              |                                                        |
| 3. Emotional/Mental State    |                                                                                                       |                                                                                         |                                                                              |              |                                                        |
| (a) Self esteem              | Gupta & Derevensky, 1998a                                                                             | Adolescent pathological gamblers have lower self-esteem compared with other adolescents |                                                                              |              |                                                        |
| (b) Depression               | Gupta & Derevensky, 1998a, 1998b; Marget, Gupta & Derevensky, 1999; Nower, Gupta, & Derevensky, 2000) | Adolescent problem gamblers have higher rates of depression                             |                                                                              |              |                                                        |
| (c) Suicide Attempts         | Gupta & Derevensky, 1998a; Ladouceur et al., 1994; Lesieur et al., 1991                               | Adolescents with gambling problems report higher suicide ideation and attempts          |                                                                              |              |                                                        |
| 4. Poor Coping Skills        | Margret et al., 1999, Nower et al., 2000                                                              | Adolescent with problem gambling have poor general coping skills                        | Early prevention programs need to focus on the development of coping skills. |              |                                                        |



|                                                          |                                                                                                      |                                                                                                                                                                                     |                                                                                                  |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 5. Persistent problem behaviors                          | Ladouceur et al., 1994; Maden et al., 1992; Omnifacts, 1993; Stinchfield, 2000; Winters et al., 1993 | Adolescent problem gamblers engage in other addictive behaviours (smoking, drinking, alcohol, illegal drug use) and often have a history of delinquency.                            |                                                                                                  |
| 6. Ethnic & Cultural Identity                            | Lesieur et al., 1991; Wallisch, 1993; Zitzow, 1993                                                   | Are more likely to be non-white (in the U.S.)                                                                                                                                       |                                                                                                  |
| 7. Gambling behaviors<br>(a) Cognitive factors           | Fisher, 1993; Tversky & Kahneman, 1973; Wagenaar, 1970, 1988                                         | Consistently chase losses. Erroneous perceptions during gambling (e.g., view fruit machine playing as skillful).                                                                    | Gaboury & Ladouceur, 1993                                                                        |
| (b) Early Win<br>(c) Early onset of gambling experiences | Griffiths, 1995<br>Gupta & Derevensky, 1997a, 1998a; Wynne et al., 1996                              |                                                                                                                                                                                     |                                                                                                  |
| 8. Attitudes favorable to problem gambling               | Derevensky, Gupta, & Emond, 1995; Wood & Griffiths, 2001                                             | As children get older their fear of being caught in a gambling activity decreases. Adolescent attitudes and behavior toward gambling predict gambling behaviour in later adulthood. | Foster social norms opposing childhood gambling experiences                                      |
| 9. Familial Factors                                      | Gupta & Derevensky, 1997a, 1997b                                                                     | Pathological gamblers and youth in general report early gambling in the home and with family members. Siblings appear to be the predominant influence.                              | The development of prevention programs designed to target elementary aged children are required. |

(continued)

**Table 2 (Continued)**

| <i>Risk</i>                  |                                                                                                                                                                                  |                                                                                                                         | <i>Intervention</i>                                                                          |              |                                                       |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------|
| <i>Risk Factor/Correlate</i> | <i>Study</i>                                                                                                                                                                     | <i>Evidence (findings)</i>                                                                                              | <i>Implications</i>                                                                          | <i>Study</i> | <i>Effects on Risk Factor or Use/Abuse (findings)</i> |
|                              | Browne & Brown, 1993; Fisher, 1993; Griffiths, 1995; Gupta & Derevensky, 1998a; Ide-Smith & Lea, 1988; Insight Canada Research, 1994; Wood & Griffiths, 1998; Wynne et al., 1996 | Pathological gamblers are more likely to have parents with an addiction or involvement in illegal activity              | Target interventions to children whose parents or siblings are gamblers or problem gamblers. |              |                                                       |
|                              | Volberg, 1994; Winters et al. 1993                                                                                                                                               | Problem gambling alone (without taking parental problems into account) is associated with gambling problems in children |                                                                                              |              |                                                       |
|                              | Ladouceur et al. 1998                                                                                                                                                            | Lack of parental knowledge about adolescent problem gambling                                                            | Youth problem gambling prevention programs should include information for parents.           |              |                                                       |
| 10. School difficulties      | Ladouceur et al., 1999; Lesieur et al., 1991; Wallisch, 1993                                                                                                                     | Truant from school to go gambling. Poor grades in school.                                                               |                                                                                              |              |                                                       |

## 11. Laws and Norms

|                    |                                                                          |                                                                                                                                                                                                               |
|--------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) Cultural norms | Gupta & Derevensky, 1996; Wood & Griffiths, 1998; Wood & Griffiths, 2000 | Parents & family members are not aware of the dangers inherent in children regularly engaging in gambling activities; Educators are not aware of the numbers of children who are gambling on a regular basis. |
| (b) Media          | Independent Television Commission, 1995; Fisher & Balding, 1998          | A television lottery draw program found to be amongst the most popular television programs watched by teens in the UK                                                                                         |
| (c) Availability   | Jacques et al., 2000; Griffiths, 1995                                    | Greater accessibility found to be related to increased gambling, money spent on gambling, increased numbers of problem gamblers.                                                                              |

---

This chart includes correlates of youth problem gambling in conjunction with risk factors for youth problem gambling as the body of empirical evidence on causal risk factors is limited.

---

common risk factors for school, community, and society domains respectively.

Although some research has been undertaken to identify risk factors of problem adolescent gambling (see Derevensky & Gupta, 2000; Griffiths & Wood, 2000; Gupta & Derevensky, 2000 for reviews) there are no studies on protective mechanisms, or more generally on resiliency, for youth with respect to problem gambling. This area is in need of considerable research. Protective factors that have been examined across other youthful addictions generally fall into the three categories: care and support, dispositional attributes such as positive and high expectations, and opportunities for participation (Werner, 1989). These characteristics appear to describe each domain that fosters resiliency in youth.

### **LEARNING FROM ADDICTION PREVENTION EFFORTS**

Given the similarities in risk and protective factors across several addictions, (e.g., cigarette smoking, alcohol abuse, substance abuse), prevention specialists and educators are best advised to pay closer attention to the evaluations of substance abuse prevention. Implementing responsible prevention programs include incorporating knowledge acquired from basic and applied research, program testing and evaluation, multifaceted and multidimensional approaches, and ensuring prevention efforts strategies and materials are appropriate for the developmental level of their target group.

#### *Incorporating Knowledge Acquired from Research*

The need to apply research on risk and resiliency in the formation of theory-driven prevention programs, accompanied by scientific evaluation research, is clear. However, the field of addiction prevention has generated little systematic testing of interventions developed in line with competing models of adolescent drug use and evidence of program effectiveness tends to be cited selectively to support the use of certain programs (Brown & D'Emidio-Caston, 1995; Gorman, 1998). Issues that question the validity of supporting research include using high-fidelity subsamples (Gorman, 1998), various ways of analyzing data lead to different conclusions (Kreft, 1998), and the interpretation of effectiveness relative to the outcome measures used (Botvin, 1996).

Such evidence suggests that successful techniques of widespread school-based drug prevention programs have not yet been adequately developed despite the vital importance of using schools as a basis for prevention through promotion of social and personal competence (Haggerty, Sherrod, Garmezy, & Rutter, 1994). If we are to create effective prevention programs to deter or minimize problem gambling, we need to give close consideration to these difficulties and work to maximize the impact of our current and future initiatives. Incorporating our current knowledge base of youth with severe gambling problems remains crucial.

#### *Program Testing and Evaluation*

Few prevention programs for youth problem gambling currently exist. Of those that are being implemented (*Probability, Statistics, and Number Sense in Gambling and Everyday Life: A Contemporary Mathematics Curriculum* program [Shaffer, Hall, & Vander Bilt, 1996]; *Drawing the Line: A resource for the prevention of problem gambling* [Nova Scotia Department of Health]; *Deal Me In: Gambling Trigger Videos and Posters* [Minnesota Institute of Public Health, Svendsen]; *Spare Time, Spare Cash Video*, [Alberta Alcohol and Drug Abuse Commission]; *Problem Gambling: The Healing Circle*, [Alberta Alcohol and Drug Abuse Commission]; *Minor Bettors, Major Problems Video*, [Canadian Federation for Compulsive Gambling, Ontario]; *Improving Your Odds*, [Minnesota Institute of Public Health, Svendsen & Griffin]; *Wanna Bet? Curriculum Guide and Video*, [Minnesota Council on Compulsive Gambling, North American Training Institute] many have no science-based principles and none have been systematically tested with the exception of a preliminary evaluation of *The Count Me Out (Moi, je passe)* (Le Groupe Jeunesse, 2000). This makes program testing and evaluation an incomprehensible task. Prevention programs need to be tested for effectiveness *prior* to their widespread implementation and require ongoing evaluation for program refinement. In quantitative research, the testing of a null hypothesis suggests that a program is considered ineffective until results are significant to reject the hypothesis of ineffectiveness. When it comes to testing the effectiveness of youth health-related prevention programs, this standard is often not applied. For example, it appears that interventions for problem behaviors (e.g., aggression, delinquency, and substance abuse) may actually inadvertently increase adolescent problem behavior, particularly when high-risk youth are grouped together to receive prevention and intervention programs (Brown & D'Emidio-

Caston, 1995; Dishion & McCord, 1999; Palinkas, Atkins, Miller, & Ferreira, 1996).

Program development is an ongoing evaluation process. Viewing various risk and protective factors in light of the domains in which they operate provides a means to specify program goals (targeting specific factors), to establish evaluation criteria, and to retrieve outcomes of the prevention program. Several of the program evaluations presented in Table 1 applied this method to program development and evaluation and in doing so, gained additional understanding about how the effects of specific risk and protective factors work. It is hoped that similar information gained from existing gambling prevention programs can be used to refine and improve such programs. Particularly important to school-based programs, is the need to conduct focus groups with teachers and children for input on program development and to evaluate teacher willingness to implement the prevention format.

Collectively, we need to ensure that scientifically validated prevention program evaluations are both credible and generalizable. For example, the Centre for Substance Abuse and Prevention advocates the use of programs that have demonstrated effectiveness based on program evaluations that have passed the test of 'scientific credibility.' The criteria it uses to determine the credibility of evaluations include: theory-driven findings, high fidelity implementation, quality of sampling design, the use of appropriate psychometric evaluation measures, appropriateness of data collection and analysis techniques, and addressing plausible alternative hypotheses concerning program effects, integrity, and utility (Brounstein et al., 1999). When we have scientific data concerning a program's effectiveness, we will have more confidence in its implementation with other groups of teens and in large-scale efforts. However, this type of program development, implementations and evaluation is a costly proposition. If educators, administrators, and public health officials fail to see the necessity for such programs, little funding shall be forthcoming, precluding the development of such prevention tools.

#### *Taking a Multifaceted Approach*

Resiliency occurs after action is taken to alter the child's environment. Taking a multifaceted approach toward problem gambling means fostering in youth, strategies to successfully resolve stressful life events

by addressing risk and protective factors in all areas that affect youth including individual, family, peer, school, community and society (Brounstein et al., 1999).

Findings from the field of adolescent alcohol and substance abuse leave us with the clear message that no one single approach to prevention appears to be uniformly successful (Baer, MacLean, & Marlatt, 1998). We must therefore look to a combination of strategies that work together towards the goal of nurturing resilience in youth.

The Center for Substance Abuse Prevention (1993) has outlined a number of strategies that can be combined in the development of school, family and community prevention programs that target each area that affects youth functioning. These strategies include: information dissemination, prevention education (critical life and social skills), offering alternative activities, problem identification and referral, community-based processes (training community members and agencies in substance use education and prevention) and active lobbying for policy alterations or additions that will aim to reduce risk factors and enhance protective factors for substance abuse.

In Table 1, a number of initiatives for addiction prevention are presented. The degree of success for each program is largely a function of its multifaceted interventions targeting the specific needs of its audiences. For example, the DARE To Be You (DTBY) program combined information dissemination, prevention education, problem identification and referral, and community-based strategies that were evaluated to have operated effectively in the individual, family and community domains (Brounstein, Zweig, & Gardner 1999; Fritz, Miller-Heyl, Kreutzer & MacPhee, 1995; Miller-Heyl, MacPhee & Fritz, 1998).

#### *Adjusting the Material to the Developmental Level of the Child/Adolescent*

It is crucial for programs to adjust the strategies and material of prevention programs to the developmental level of the individual receiving the intervention. Developmental research should form the basis of prevention strategies. For example, the age of the child and the peer grouping (e.g., grouping antisocial- and prosocial-inclined children together for prevention interventions) may impact whether the program has positive, negative or nominal effects on the participants (i.e., grouping antisocial adolescents together for intervention seems to be associated with more negative outcomes for older rather than younger children) (Dishion & McCord, 1999). Prevention pro-

grams also need to bear in mind that coping strategies and social, academic, and economic pressures change with the age of the child (Eisenberg, Fabes, & Guthrie, 1997) and ensure that materials and outcome measures are congruent with what is currently known about coping and adaptive behaviors at different ages.

*Effective Prevention Flows from Effective Social Policy*

Prevention programs represent a form of social policy. It has been argued that the strength of prevention programs that address problem gambling issues for youth are highly dependent upon their social policy foundation. We need to obtain clarity in the articulation of responsible social policies and ensure that they reflect findings from research based on resilience and effective program evaluations. Current policies that reflect the predominant attitude that gambling has few negative consequences and is merely a form of entertainment leaves little credence to effective youth problem gambling prevention initiatives. Changing widespread attitudes about problem gambling will empower prevention efforts to encourage youth to make healthy decisions about gambling and other potentially health-compromising behaviors.

Social policies concerning problem gambling among youth are relatively scarce. While most states and provinces have established laws concerning the legal minimum age of casino entry, several States and Provinces have yet to establish legislative policies in regards to adolescent gambling. Laws, policies and subsequent prevention programs for adolescent gambling need to be coherent. If gambling prevention programs were to promote zero-tolerance policies, it is inevitable that they would face the same difficulties several substance abuse programs have experienced, given the wide social acceptance gambling holds in our society (Azmier, 2000), lack of parental concern (Ladouceur, Jacques, Ferland, & Giroux, 1998), and the lack of gambling law enforcement (in particular the selling of lottery and scratch tickets to youth). Just as current research on substance abuse prevention suggests that programs may be more effective if substance use education policies and prevention services incorporate students' perceptions and attitudes (Brown & D'Emidio, 1995; Gorman, 1998), it is important to understand and incorporate youth perceptions of problem gambling into the development and evaluation of problem gambling policies and prevention programs.



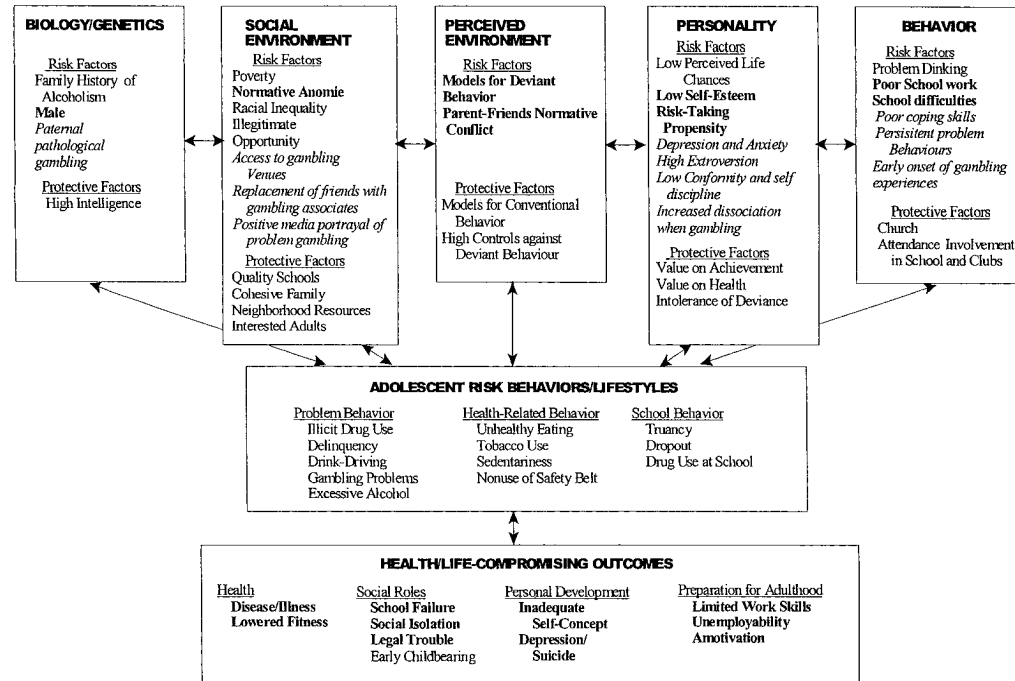
### A GENERAL THEORETICAL MODEL FOR THE PREVENTION OF ADOLESCENT RISKY BEHAVIOR

The commonalities amongst alcohol, tobacco and illicit drug use has already led to the integration of many of these programs into more general substance abuse prevention programs. Our examination of the commonalities of risk factors for problem gambling and other addictions provides sufficient reason to believe that gambling can similarly be incorporated into a more general addiction and adolescent risk behavior prevention programs. Current research efforts (Battistich, Schaps, Watson, & Solomon, 1996; Costello et al., 1999; Galambos & Tilton-Weaver, 1998; Loeber et al., 1998) suggests our contention to offer more general mental health prevention programs that address a number of adolescent risky behaviors (e.g., substance abuse, gambling, risky driving, truancy, and risky sexual activity).

Jessor (1998) provides us with a model from which we can view problem gambling as a form of adolescent risky behavior with health and life-compromising outcomes. The conceptual framework presented in Figure 2 has been adapted from Jessor's (1998) model and is predicated upon the rationale that it provides us with a theoretical foundation for general mental health prevention programs that are based upon fostering resiliency. The model represents current trends in thinking about adolescent risk behavior. Risk and protective factors operate *interactively*, in and across a number of domains (biology, social environment, perceived environment, personality and behavior). The risk and protective factors represented in Figure 2 have been previously identified from empirical research, much of which are found in Tables 1 and 2.

The adolescent risk behavior model provides flexibility, permitting us to incorporate current research on risk and resilience on an ongoing basis. Problem gambling has been included into this framework based upon a growing body of empirical research. Problem adolescent gambling has a number of unique risk factors (indicated in italics) including paternal pathological gambling, access to gambling venues, depression and anxiety, high extroversion, low conformity and self discipline, poor coping skills and adaptive behavior, persistent problem behaviors and early onset of gambling experiences. Problem adolescent gambling also shares a number of common risk factors with other health compromising behaviors (indicated in bold font). These include being male, normative anomie, models for deviant behaviour,

**Figure 2**  
**The Adolescent Risk Behaviour Model with Incorporated Youth Gambling Risk Factors**



**Bold** : shared risk factors

*Italics* : factors specific to gambling

Adapted from Jessor (1998).

parent-friends normative conflict, low self-esteem, high risk-taking propensity, poor school work and school difficulties. The remaining risk factors in this model (presented in standard font) are those that have either not been studied or have not been found to be risk factors for problem gambling among youth but have been found to be antecedents for other adolescent risk behaviors.

As noted earlier, protective factors for youth problem gambling have not been examined. However, the significant factors of parent-family connectedness and perceived school connectedness, which were found to be protective against every health risk behavior measure except pregnancy (Resnick et al., 1997), are likely also to help prevent youth from engaging in problem gambling.

As noted in Figure 2, variance in factors that influence whether an adolescent will engage in risk behaviors and variance in health outcomes amplifies the need to target the development of resiliency in children and youth. A wide range of factors work together to influence whether an adolescent will engage in gambling behavior including being male (biology), access to gambling venues (social environment), models for deviant behavior (perceived environment), depression and anxiety (personality), and poor coping skills (behavior). With the exception of early childbearing, adolescent problem gambling shares all health compromising outcomes similar to other youth risk behaviors. These outcomes vary from threats to physical health, compromises to various social roles (such as school failure or social isolation), threats to personal development (e.g., lowered self-concept) and compromises to typical tasks that prepare adolescents for adulthood such as acquiring motivation and skills to maintain a job. The illustration of numerous possible risk behavior antecedents, risk behaviors, and health-compromising outcomes in this model clearly points to the need for multifaceted approaches to prevention.

### CONCLUDING REMARKS

Only recently have health professionals, educators and public policy makers voiced an acknowledgment of the need for prevention of problem gambling among youth. In light of the scarcity of empirical knowledge about the prevention of this disorder, the similarities between adolescent problem gambling and other risk behaviors, partic-

ularly alcohol and substance abuse, have been examined and found to be informative in our conceptualization of the future direction of youth gambling prevention programs.

In this review, we have illustrated the importance of using a conceptual model as the foundation for prevention efforts and have argued that research, development of prevention programs, and their acceptability into school-based curriculums should be conceptualized into a wider picture of youth problem and risk-taking behaviors. Despite our limited knowledge of the role of protective factors in adolescent gambling problems (and more empirical work needs to be done in this area), there is ample research to suggest that direct and moderator effects of protection can be used to guide the development of prevention and intervention efforts to help minimize adolescent risk behaviors. An adapted version of Jessor's (1998) adolescent risk behavior model provides a useful framework from which to begin the much needed development of effective, science-based prevention initiatives for minimizing problem gambling among youth.

## REFERENCES

- Ahmed, S. W., Bush, P. J., Davidson, F. R., & Iannotti, R. J. (1984, November). *Predicting children's use and intentions to use abusable substances*. Paper presented at the Annual Meeting of the American Public Health Association, Anaheim, CA.
- Aktan, G. B., Kumpfer, K. L., & Turner, C. W. (1996). Effectiveness of a family skills training program for substance use prevention with inner city African-American families. *Substance Use & Misuse, 31*(2), 157-175.
- Alberta Alcohol and Drug Abuse Commission. (1995). *Problem Gambling: The Healing Circle*. Edmonton, AB: AADAC Resource Development and Marketing.
- Alberta Alcohol and Drug Abuse Commission. (1996). *Spare Time, Spare Cash Video*. Edmonton, AB: AADAC Resource Development and Marketing.
- Ary, D. V., Tildesley, E., Hops, H., & Andrews, J. (1993). The influence of parent, sibling, and peer modeling and attitudes on adolescent use of alcohol. *The International Journal of the Addictions, 28*, 853-880.
- Atkin, C., Hocking, J., & Block, M. (1984). Teenage drinking: Does advertising make a difference? *Journal of Communication, 34*, 157-167.
- Australian Productivity Commission (1999). *Australia's Gambling Industries*. Productivity Commission, December.
- Azmier, J. J. (2000). *Canadian gambling behavior and attitudes: Summary report*. (CWF Publication No. 200001). Calgary: Canada West Foundation.
- Azmier, J., & Smith, G. (1998). *The state of gambling in Canada: An interprovincial roadmap of gambling and its impacts* (CWF Publication No. 9808). Calgary: Canada West Foundation.
- Bachman, J. G., Johnston, L. D., & O'Malley, P. M. (1991). How changes in drug use are linked to perceived risks and disapproval: Evidence from national studies that youth and young adults respond to information about the consequences of drug use. In L. Donohew, H. E. Sypher, & W. J. Bukoski. (Eds.), *Persuasive communication an drug abuse prevention* (pp. 133-135). Hillsdale, NJ: Erlbaum.

- Bachman, J. G., Lloyd, D. J., & O'Malley, P.M. (1981). Smoking, drinking, and drug use among American high school students: Correlates and trends, 1975–1979. *American Journal of Public Health, 71*, 59–69.
- Baer, J. MacLean, M. and Marlatt, G. (1998). Linking etiology and treatment for adolescent substance abuse: Toward a better match. In R. Jessor. *New perspectives on adolescent risk behavior*. Cambridge, UK: Cambridge University Press.
- Barnes, G. M., & Welte, J. W. (1986). Patterns and predictors of alcohol use among 7–12<sup>th</sup> grade students in New York State. *Journal of Studies on Alcohol, 47*, 53–62.
- Battistich, V., Schaps, E., Watson, M., & Solomon, D. (1996). Prevention effects of the Child Development Project: Early findings from an ongoing multisite demonstration trial. *Journal of Adolescent Research, 11*(1), 12–35.
- Battistich, V., Solomon, D., Kim, D., Watson, M., & Schaps, E. (1995). Schools as communities, poverty levels of student populations, and students' attitudes, motives, and performance: A multilevel analysis. *American Educational Research Journal, 32*, 627–658.
- Baumrind, D. (1983, October). *Why adolescents take chances—And why they don't*. Paper presented at the National Institute for Child Health and Human Development, Bethesda, MD.
- Bell, N. J., Forthun, L. F., & Sun, S. (2000). Attachment, adolescent competencies, and substance use: Developmental considerations in the study of risk behaviors. *Substance Use & Misuse, 35*(9), 177–1206.
- Berrueta-Clement, J. R., Schweinhart, L. J., Barnett, W. S., Epstein, A. S., & Weikart, D. P. (1985). *Changed lives: The effects of the Perry Preschool Program on youth through age 19*. Ypsilanti, MI: High Scope Press.
- Block, J., Block, J. H., & Keyes, S., (1988). Longitudinally foretelling drug usage in adolescence: Early childhood personality and environmental precursors. *Child Development, 59*, 336–355.
- Blum, K., Noble, E. P., Sheridan, P. J., Montgomery, A., Ritchie, T., Jagadeeswonan, P., Nogami, H., Briggs, A. H., & Cohen, J. B. (1990). Allelic association of human dopamine D<sub>2</sub> receptor gene in alcoholism. *Journal of the American Medical Association, 263*, 2094–2095.
- Blum, K., Sheridan, P. J., Chen, T. C., Wood, R. C., Braverman, E. R., Cull, J. G. & Comings, D. E. (1997). The dopamine D2 receptor gene locus in reward deficiency syndrome: Meta-analyses. In K. Blum, & E. Noble (Eds.), *Handbook of psychiatric genetics*. (pp. 407–432). Boca Raton: Crc Press, Inc.
- Botvin, G. J. (1995). Drug abuse prevention in school settings. In G. J. Botvin, S. Schinke, & M. A. Orlandi (Eds.), *Drug abuse prevention with multiethnic youth* (pp. 169–192). Thousand Oaks: Sage Publications.
- Botvin, G. J. (1996). Substance abuse prevention through life skills training. In R. De V. Peters and R. J. McMahon. (Eds.), *Preventing childhood disorders, substance abuse, and delinquency* (pp. 215–240). Thousand Oaks, CA: Sage.
- Botvin, G., Schinke, S., Epstein, J., Diaz, T., & Botvin, E. (1995). Effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority adolescents: Two-year follow-up results. *Psychology of Addictive Behaviors, 9*(3), 183–194.
- Brook, J. S., Balka, E. B., Brook, D. W., Win, P. T., & Gursen, M. D. (1998). Drug use among African Americans: Ethnic identity as a protective factor. *Psychological Reports, 83*(3), 1427–1446
- Brook, J. S., Brook, D. W., Gordon, A. S., Whiteman, M., & Cohen, P. (1990). The psychosocial etiology of adolescent drug use: A family interactional approach. *Genetic, Social, and General Psychology Monographs, 116*, 1–45.
- Brook, J. S., Gordon, A. S., Whiteman, M., & Cohen, P. (1986). Some models and mechanisms for explaining the impact of maternal and adolescent characteristics on adolescent stage of drug use. *Developmental Psychology, 22*, 460–467.
- Brook, J. S., Whiteman, M., Balka, E. B., & Hamburg, B. A. (1992). African-American and Puerto Rican drug use: Personality, familial, and other environmental risk factors. *Genetic, Social, and General Psychology Monographs, 118*, 417–438.
- Brook, J. S., Whiteman, M., Balka, E. B., Win, P. T., & Gursen, M. D. (1998). Drug use among Puerto Ricans: Ethnic identity as a protective factor. *Hispanic Journal of Behavioral Sciences, 20*(2), 241–254.
- Brounstein, P. J., Zweig, J. M., & Gardner, S. E. (1999). *Understanding Substance Abuse Prevention: Toward the 21<sup>st</sup> Century: A Primer on Effective Programs*. Rockville: U.S. Department of Health and

- Human Services, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention, Division of Knowledge Development and Evaluation.
- Brown, J. H., & D'Emidio-Caston, M. (1995). On becoming 'at risk' through drug education: How symbolic policies and their practices affect students. *Evaluation Review*, *19*(4), 451–492.
- Brown, J. H., D'Emidio-Caston, M., & Benard, B. (2001). *Resilience education*. Thousand Oaks: Corwin Press.
- Brown, J. H., D'Emidio-Caston, M., & Pollard, J. (1997). Students and substances: Social power in drug education. *Educational Evaluation and Policy Analysis (EPA)*, *19*(1), 65–82.
- Brown, J. H., & Horowitz, J. E. (1993). Deviance and deviants: Why adolescent substance use prevention programs do not work. *Evaluation Review*, *17*(5), 529–555.
- Browne, B. A., & Brown, D. J. (1993). Predictors of lottery gambling among American college students. *Journal of Social Psychology*, *134*, 339–347.
- Brunswick, A. F., McKeon, P., & Pandina, R. J. (1982). Extent of drug use as a function of number of risk factors. *Journal of Abnormal Psychology*, *91*, 273–279.
- Canadian Federation for Compulsive Gambling. *Minor Bettors, Major Problems Video*. Toronto, ON: Author.
- Centre of Addiction and Mental Health. *Dealing with cognitive distortions*. Toronto: ON: Author.
- Chassin, L., Barrera, M., & Montgomery, H. (1997). Parental alcoholism as a risk factor. In S. A. Wolchik & I. N. Sandler (Eds.), *Handbook of children's coping: Linking theory and intervention*. New York: Plenum Press.
- Chassin, L., Curran, P. J., Hussong, A. M., & Colder, C. R. (1996). The relation of parent alcoholism to adolescent substance use: A longitudinal follow-up study. *Journal of Abnormal Psychology*, *105*(1), 70–80.
- Chassin, L., Pitts, S. C., DeLucia, C., & Todd, M. (1999). A longitudinal study of children of alcoholics: Predicting young adult substance use disorders, anxiety, and depression. *Journal of Abnormal Psychology*, *108*(1), 106–119.
- Chassin, L., Rogosch, F., & Barrera, M. (1991). Substance use and symptomatology among adolescent children of alcoholics. *Journal of Abnormal Psychology*, *100*, 449–463.
- Clark, D. B., Lesnick, L., & Hegedus, A. M. (1997). Traumas and other adverse life events in adolescents with alcohol abuse and dependence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(12), 1744–1751.
- Clayton, R. R., Cattarello, A., & Walden, K. P. (1991). Sensations seeking as a potential mediating variable for school-based prevention intervention: A two-year follow-up of DARE. *Health Communication*, *3*, 229–239.
- Cloninger, C. R. (1990). Event-related potentials in populations at genetic risk: Genetic principles and research strategies. In J. W. Rohrbaugh & R. Parasuraman. (Eds.), *Event-related brain potentials: Basic issues and applications*. (pp. 333–342). New York: Oxford University Press.
- Cloninger, C. R., Sigvardsson, S., & Bohman, M. (1988). Childhood personality predicts alcohol abuse in young adults. *Alcoholism*, *12*, 494–503.
- Coate, D., & Grossman, M. (1988). Effects of alcoholic beverage prices and legal drinking ages on youth alcohol use. *Journal of Law and Economics*, *31*, 145–171.
- Coie, J., Watt, N., West, S., Hawkins, J., Asarnow, J., Markman, H., Ramey, S., Shure, M., & Long, B. (1993). The science of prevention. *American Psychologist*, *48*(10), 1013–1022.
- Colder, C. R., & Chassin, L. (1997). Affectivity and impulsivity: Temperament risk for adolescent alcohol involvement. *Psychology of Addictive Behaviors*, *11*(2), 83–97.
- Colder, C. R., & Chassin, L. (1999). The psychosocial characteristics of alcohol users versus problem users: Data from a study of adolescents at risk. *Development & Psychopathology*, *11*(2), 321–348.
- Costello, E. J., Erkanli, A., Federman, E., & Angold, A. (1999). Development of psychiatric comorbidity with substance abuse in adolescents: Effects of timing and sex. *Journal of Clinical Child Psychology*, *28*(3), 298–311.
- Derevensky, J., & Gupta, R. (2000). Prevalence estimates of adolescent gambling: A comparison of SOGS-RA, DSM-IV-J, and the GA 20 Questions. *Journal of Gambling Studies*, *16*(2/3), 227–252.
- Derevensky, J. L., Gupta, R., & Della Cioppa, G. (1996). A developmental perspective on gambling behavior in children and adolescents. *Journal of Gambling Studies*, *12*, 49–66.
- Derevensky, J., Gupta, R., & Emond, M. (1995). Locus of control, video game playing, and gam-

- bling behavior in children. Poster presented at the annual meeting of the American Psychological Association, New York City, August.
- DiCicco, L., Biron, R., Carifio, J., Deutsch, C., Mills, D., Orenstein, A., Re, A., Unterberger, H., & White, D. (1984). Evaluation of the CASPAR alcohol education curriculum. *Journal of Studies on Alcohol*, 45(2), 160–169.
- Dishion, T. J., Andrews, D. W., Kavanagh, K., & Soberman, L. H. (1996). Preventive interventions for high-risk youth: The adolescent transitions program. In R. D. Peters & R. J. McMahon (Eds.), *Preventing childhood disorders, substance abuse, and delinquency. Banff international behavioral science series, Vol. 3* (pp. 184–214). Thousand Oaks, CA: Sage Publications.
- Dishion, T. J., Capaldi, D. M., & Yoerger, K. (1999). Middle childhood antecedents to progressions in male adolescent substance use: An ecological analysis of risk and protection. *Journal of Adolescent Research*, 2, 175–205.
- Dishion, T., & McCord, J. (1999). When interventions harm: Peer groups and problem behavior. *American Psychologist*, 54(9), 755–764.
- Dishion, T. J., Patterson, G. R., & Kavanagh, K. A. (1992). An experimental test of the coercion model: Linking theory, measurement and intervention. In J. McCord & R. E. Tremble (Eds.), *Preventing anti-social behavior: Interventions from birth through adolescence*. New York, NY: Guilford.
- Downs, W. R., & Harrison, L. (1998). Childhood maltreatment and the risk of substance problems in later life. *Health & Social Care in the Community*, 6, 1, 35–46.
- Dumas, J. E., Prinz, R. J., Smith, E. P., & Laughlin, J. (1999). The EARLY ALLIANCE prevention trial: An integrated set of interventions to promote competence and reduce risk for conduct disorder, substance abuse, and school failure. *Clinical Child & Family Psychology Review*, 2(1), 37–53.
- Eggert, L. L., Thompson, E. A., Herting, J. R., Nicholas, L. J., & Dicker, B. G. (1994). Preventing adolescent drug abuse and high-school dropout through an intensive school-based social network development program. *American Journal of Health Promotion*, 8(3), 202–215.
- Eisenberg, N., Fabes, R., & Guthrie, I. (1997). Coping with stress: Roles of regulation and development. In S. A. Wolchik, I. N. Sandler, et al. (Eds.), *Handbook of children's coping: Linking theory and intervention. Issues in clinical child psychology* (pp. 41–70). New York: Plenum Press.
- Elder, C., Leaver-Dunn, D., Wang, M., Nagy, S., & Green, L. (2000). Organized group activity as a protective factor against adolescent substance use. *American Journal of Health Behavior*, 24(2), 108–113.
- Ellickson, P. L., Bell, R. M., & McGuigan, K. (1993). Preventing adolescent drug use: Long-term results of a junior high program. *American Journal of Public Health*, 83, 856–861.
- Fagan, J. (1988). *The social organization of drug use and drug dealing among urban gangs*. New York: John Jay College of Criminal Justice.
- Felner, R. D., Brand, S., Adan, A. M., Mulhall, P. F., Flowers, N., Sartain, B., & DuBois, D. L. (1993). Restructuring the ecology of the school as an approach to prevention during school transitions: Longitudinal follow-ups and extensions of the School Transitional Environment Project (STEP). *Prevention in Human Services*, 10(2), 103–136.
- Ferrell, A. D., Danish, S. J., & Howard, C. W. (1992). Risk factors for drug use in urban adolescents: Identification and cross-validation. *American Journal of Community Psychology*, 20, 263–286.
- Ficaro, R. C. (1999). The many losses of children in substance-disordered families: Individual and group interventions. In N. B. Webb (Ed.), *Play therapy with children in crisis: Individual, group, and family treatment, 2<sup>nd</sup> edition* (pp. 294–317). New York: The Guilford Press.
- Fisher, S. (1993). Gambling and pathological gambling in adolescents. *Journal of Gambling Studies*, 9(3), 277–288.
- Fisher, S. E., & Balding, J. (1996). Gambling and pathological gambling in adolescence. *Journal of Gambling Studies*, 9(3), 277–287.
- Fleming, J. P., Kellam, S. G., & Brown, C. H. (1982). Early predictors of age at first use of alcohol, marijuana and cigarettes. *Drug and Alcohol Dependence*, 9, 285–303.
- Frauenglass, S., Routh, D., Pantin, H., & Mason, C. (1997). Family support decreases influences of deviant peers on Hispanic adolescents' substances use. *Journal of Clinical Child Psychology*, 26, 15–23.
- Fritz, J. J., Miller-Heyl, J., Kreutzer, J. C., & MacPhee, D. (1995). Fostering personal teaching efficacy through staff development and classroom activities. *Journal of Educational Research*, 88(4), 200–208.

- Gaboury, A., & Ladouceur, R. (1993). Evaluation of a prevention program for pathological gambling among adolescents. *Journal of Primary Prevention, 14*(1), 21–28.
- Galampos, N. L., Tilton-Weaver, L. C. (1998). Multiple risk behavior in adolescents and young adults. *Health Review, 10*, 9–20.
- Garnezy, N. (1985a). The NIMH-Israeli high-risk study: Commendations, comments, and cautions. *Schizophrenia Bulletin, 11*, 349–353.
- Garnezy, N. (1985b). Stress resistant children: The search for protective factors. In J. Stevenson (Ed.), *Recent research in developmental psychopathology. Journal of Child Psychology and Psychiatry, Book Supplement 4* (pp. 213–233). Elmsford, NY: Pergamon.
- Garnezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development, 55*, 97–111.
- Glantz, M. D., Weinberg, N. Z., Miner, L. L., & Colliver, J. D. (1999). The etiology of drug abuse: Mapping the paths. In M. D. Glantz, & C. Hartel, et al. (Eds.), *Drug abuse: Origins & interventions* (pp. 3–45). Washington, DC: American Psychological Association.
- Gorman, D. M. (1998). The irrelevance of evidence in the development of school-based drug prevention policy, 1986–1996. *Evaluation Review, 22*(1), 118–146.
- Gorman, W. B. (1995). Are school-based resistance skills training programs effective in preventing alcohol misuse? *Journal of Alcohol and Drug Education, 41*, 74–98.
- Gottfredson, G. D. (1986). An assessment of a delinquency prevention demonstration with both individual and environmental interventions. (Rep. No. 361). Center for Social Organization of Schools Report, Johns Hopkins University.
- Gottfredson, G. D. (1988). Issues in adolescent drug use. Unpublished final report to the U.S. Department of Justice, Johns Hopkins University, Center for Research on Elementary and Middle School, Baltimore.
- Govoni, R., Rupcich, N., & Frisch, G. R. (1996). Gambling behavior of adolescent gamblers. *Journal of Gambling Studies, 12*, 305–318.
- Grant, B. F., & Dawson, D. A. (1997). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results of the National Longitudinal Alcohol Epidemiological Survey. *Journal of Substance Abuse, 9*, 103–110.
- Grant, B.F., Dawson, D.A. (1998). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results of the national longitudinal alcohol epidemiological survey. *Journal of Substance Abuse, 10*, 163–173.
- Griffiths, M. D. (1995). *Adolescent gambling*. London: Routledge.
- Griffiths, M. D. (1989). Gambling in children and adolescents. *Journal of Gambling Behavior, 5*, 66–83.
- Griffiths, M. D., & Wood, R., T. (2000). Risk factors in adolescence: The case of gambling, video-game playing, and the internet. *Journal of Gambling Studies, 16*(2/3), 199–226.
- Gupta, R., & Derevensky, J. (1996). The relationship between gambling and video-playing behavior in children and adolescents. *Journal of Gambling Studies, 12*(4), 375–394.
- Gupta, R., & Derevensky, J. (1997a). Familial and social influences on juvenile gambling. *Journal of Gambling Studies, 13*, 179–192.
- Gupta, R., & Derevensky, J. (1997b, May). *Personality correlates of gambling behavior amongst adolescents*. Paper presented at the First Annual New York State Conference on Problem Gambling, Albany.
- Gupta, R., & Derevensky, J. (1998a). Adolescent gambling behavior: A prevalence study and examination of the correlates associated with excessive gambling. *Journal of Gambling Studies, 14*, 319–345.
- Gupta, R., & Derevensky, J. (1998b). An empirical examination of Jacobs' General Theory of Addictions: Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14*, 17–49.
- Gupta, R., & Derevensky, J., (2000). Adolescents with gambling problems: From research to treatment. *Journal of Gambling Studies, 16*(2/3), 315–342.
- Hammen, C. (1992). The family-environmental context of depression: A perspective on children's risk. In D. Cicchetti, & S. L. Toth (Eds.), *Developmental perspectives on depression* (pp. 251–281). Rochester symposium on developmental psychopathology, 4. Rochester: University of Rochester Press.



- Hansen, W. B. (1992). School-based drug education in North America: What is wrong/ What can be done? *Journal of School Health, 56*, 278–81.
- Hansen, W. B., & Graham, J. W. (1991). Preventing alcohol, marijuana, and cigarette use among adolescents: Peer pressure resistance training versus establishing conservative norms. *Preventive Medicine, 20*, 414–430.
- Harrington, N. G., & Donohew, L. (1997). Jump Start: A targeted substance abuse prevention program. *Health Education & Behavior, 24*(5), 568–586.
- Hawkins, J. D. & Catalano, R., (1992). *Communities that care: Action for drug abuse prevention*. San Francisco: Jossey-Bass, Inc.
- Hawkins, J. D., Graham, J. W., Maguin, E., Hill, K.G., & Catalano R., F. (1997). Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse. *Journal of Studies on Alcohol, 58*, 280–290.
- Hernandez, L. P., & Lucero, E. (1996). DAYS La Familia community drug and alcohol prevention program: Family-centered model for working with inner-city Hispanic families. *Journal of Primary Prevention, 16*(3), 255–272.
- Horn, K. A. (1998). Examination of a cumulative strategies model for drug abuse prevention: Risk factor reduction in high risk children. *Dissertation Abstracts International, 58*(12–A), 4567.
- Hundleby, J. D., & Mercer, G. W. (1987). Family and friends as social environments and their relationship to young adolescents' use of alcohol, tobacco, and marijuana. *Journal of Clinical Psychology, 44*, 125–134.
- Ide-Smith, S., & Lea, S. E. (1988). Gambling in young adolescents. *Journal of Gambling Behavior, 4*, 110–119.
- Independent Television Commission (1995). Child's-eye view. *Spectrum, 17*, 24.
- Insight Canada Research. (1994). An exploration of the prevalence of pathological gambling behavior among adolescents in Ontario. Report prepared for the Canadian Foundation on Compulsive Gambling (Ontario). Toronto: Author.
- Jacobs, D. F. (1986). A general theory of addictions: A new theoretical model. *Journal of Gambling Behavior, 2*(1), 15–31.
- Jacobs, D. F. (2000). Juvenile gambling in North America: An analysis of long term trends and future prospects. *Journal of Gambling Studies, 16*(2/3), 119–152.
- Jacobs, D. F., Marston, A., & Singer, R. (1985). Testing a general theory of addiction: Similarities and differences among alcoholics, pathological gamblers, and overeaters. In J. J. Sanchez-Soza (Ed.), *Health and clinical psychology* (Vol. 4). Netherlands: Elsevier Science.
- Jacques, C., Ladouceur, R., & Ferland, F. (2000). Impact of availability on gambling: A longitudinal study. *Canadian Journal of Psychiatry, 45*(9), 810–815.
- Jenkins, R. (1987). The influence of peer affiliation and student activities on adolescent drug involvement. *Adolescence, 31*, 297–306.
- Jessor, R. (1987). Problem-behavior theory, psychosocial development, and adolescent problem drinking. *British Journal of Addiction, 82*(4), 331–342.
- Jessor, R. (1993). Successful adolescent development among youth in high-risk settings. *American Psychologist, 48*, 117–126.
- Jessor, R. (1998). New perspectives on adolescent risk behavior. In R. Jessor (Ed.), *New perspectives on adolescent risk behavior*. Cambridge, UK: Cambridge University Press.
- Jessor, R., Van Den Bos, J., Vanderryn, J., Costa, F. M., & Turbin, M. S. (1995). Protective factors in adolescent problem behavior: Moderator effects and developmental change. *Developmental Psychology, 31*, 923–933.
- Johnson, D. L., & Walker, T. (1987). Primary prevention of behavioral problems in Mexican-American children. *American Journal of Community Psychology, 15*, 375–385.
- Johnson, K., Bryant, D., Strader, T., & Bucholtz, G. (1996). Reducing alcohol and other drug use by strengthening community, family, and youth resiliency: An evaluation of the Creating Lasting Connections Program. *Journal of Adolescent Research, 11*(1), 36–67.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1991). *Trends in drug use and associated factors among American high school students, college students, and young adults*. Rockville, MD: National Institute on Drug Abuse.
- Jones, M. B., & Offord, D. R. (1989). Reduction of anti-social behavior in poor children by non-

- school skill development. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 30, 737–750.
- Kandel, D. B., & Davies, M. (1986). The consequences in young adulthood of adolescent drug involvement. *Archives of General Psychiatry*, 43, 746–754.
- Kazdin, A. E., Siegel, T.C., & Bass, D. (1992). Cognitive problem-solving skills training and parent management training in the Treatment of anti-social behavior in children. *Journal of Consulting and Clinical Psychology*, 60, 733–747.
- Kendler, K. S., Karkowski, L. M., Neale, M. C., & Prescott, C. A. (2000). Illicit psychoactive substance use, heavy use, abuse, and dependence in a US population-based sample of male twins. *Archives of General Psychiatry*, 57(3), 261–269.
- Kendler, K. S., Karkowski, L., & Prescott, C. A. (1999). Hallucinogen, opiate, sedative and stimulant use and abuse in a population-based sample of female twins. *Acta Psychiatrica Scandinavica*, 99(5), 368–376.
- Kline, R. B. (1996). Eight-month predictive validity and covariance structure of the Alcohol Expectancy Questionnaire for Adolescents (AEQ-A) for junior high school students. *Journal of Studies on Alcohol*, 57(4), 396–405.
- Kosterman, R., Hawkins, J. D., Spoth, R., Haggerty, K. P., et al. (1997). Effects of a preventive parent-training intervention on observed family interactions: Proximal outcomes from preparing for the drug-free years. *Journal of Community Psychology*, 25(4), 337–352.
- Kreft, I. (1998). An illustration of item homogeneity scaling and multilevel analysis techniques in the evaluation of drug prevention programs. *Evaluation Review*, 22(1), 46–77.
- Kumpfer, K. L., Molgaard, V., & Spoth, R. (1996). The Strengthening Families Program for the prevention of delinquency and drug use. In R. Peters & R. McMahon (Eds.), *Preventing childhood problems, substance abuse, and delinquency* (pp. 241–267). Thousand Oaks: Sage Publications.
- Kumpfer, K., Turner, C., & Alvarado, R. (1991). A community change model for school health promotion. *Journal of Health Education*, 22(2), 94–110.
- Ladouceur, R., Boudreault, N., Jacques, C., & Vitaro, F. (1999). Pathological gambling and related problems among adolescents. *Journal of Child & Adolescent Substance Abuse*, 8(4), 55–68.
- Ladouceur, R., Dubé, D., & Bujold, A. (1994). Prevalence of pathological gamblers and related problems among college students in the Quebec metropolitan area. *Canadian Journal of Psychiatry*, 39, 289–293.
- Ladouceur, R., Jacques, C., Ferland, F., & Giroux, I. (1998). Parents' attitudes and knowledge regarding gambling among youths. *Journal of Gambling Studies*, 14(1), 83–90.
- Ladouceur, R. & Mireault, C. (1988). Gambling behaviors among high school students in the Quebec area. *Journal of Gambling Behavior*, 4(1), 3–12.
- Laughery, K., Young, S., Vaubel, K., & Brelsford, J. (1993). Noticeability of warnings on alcohol beverage containers. *Journal of Public Policy and Marketing*, 12(1), 38–56.
- Le Groupe Jeunesse. (2000). *The Count Me Out (Moi, je passe) awareness program for the prevention of gambling dependency*. Montreal, QC: Le Groupe Jeunesse.
- Lesieur, H. R., Cross, J., Frank, M., Welch, M., White, C. M., Rubenstein, G. Moseley, K. & Mark, M. (1991). Gambling and pathological gambling among university students. *Addictive Behaviors: An International Journal*, 16, 517–527.
- Lesieur, H. R., & Klein, R. (1987). Pathological gambling among high school students. *Addictive Behaviors*, 12(2), 129–135.
- Loeber, R., Farrington, D., Stouthamer-Loeber, M., & Van Kammen, W. (1998). Multiple risk factors for multiproblem boys: Co-occurrence of delinquency, substance use, attention deficit, conduct problems, physical aggression, covert behavior, depressed mood, and shy/withdrawn behavior. In R. Jessor (Ed.), *New perspectives on adolescent risk behavior*. Cambridge, UK: Cambridge University Press.
- Loeber, R., Stouthamer-Loeber, M., & White, H. (1999). Developmental aspects of delinquency and internalizing problems and their association with persistent juvenile substance use between ages 7 and 18. *Journal of Clinical Child Psychology*, 28(3), 322–332.
- Loh, E., & Ball, D. (2000). Role of the GABA-sub(A)beta2, GABA-sub(A)alpha6, GABA-sub(A)alpha1 and GABA-sub(A)gamma2 receptor subunit genes cluster in drug responses and the development of alcohol dependence. *Neurochemistry International*, 37(5–6), 413–423.

- LoSciuto, L., Rajala, A. K., Townsend, T. N., & Taylor, A. S. (1996). An outcome evaluation of Across Ages: An intergenerational mentoring approach to drug prevention. *Journal of Adolescent Research, 11*(1), 116–129.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000a). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543–562.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000b). Research on resilience: Response to commentaries. *Child Development, 71*(3), 573–575.
- Lynskey, M. T. & Fergusson, D. M. (1995). Childhood conduct problems, attention deficit behaviors, and adolescent alcohol, tobacco, and illicit drug use. *Journal of Abnormal Child Psychology, 23*, 281–302.
- Maddahian, E., Newcomb, M. D., & Bentler, P. M. (1988). Adolescent drug use and intention to use drugs: Concurrent and longitudinal analyses of four ethnic groups. *Addictive Behaviors, 13*, 191–195.
- Maden, T., Swinton, M., & Gunn, J. (1992). Gambling in young offenders. *Criminal Behavioral and Mental Health, 2*, 300–308.
- Maes, H. H., Woodard, C. E., Murrelle, L., Meyer, J. M., Silberg, J. L., Hewitt, J. K., Rutter, M., Simonoff, E., Pickles, A., Carbonneau, R., Neale, M. C., & Eaves, L. J. (1999). Tobacco, alcohol and drug use in eight- to sixteen-year-old twins: The Virginia Twin Study of Adolescent Behavioral Development. *Journal of Studies on Alcohol, 60*(3), 293–305.
- Marget, N., Gupta, R. & Derevensky, J. (1999, August), *The psychosocial factors underlying adolescent problem gambling*. Poster presented at the annual meeting of the American Psychological Association, Boston.
- Masten, A., Best, K., & Garmezy, N. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology, 2*, 425–444.
- Masten, A. S., Hubbard, J. J., Gest, S. D., Tellegen, A., Garmezy, N., & Ramirez, M. (1999). Adaptation in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. *Development and Psychopathology, 11*, 143–169.
- Merikangas, K. R. (1990). The genetic epidemiology of alcoholism. *Psychological Medicine, 20*, 11–22.
- Merikangas, K., Stolar, M., Stevens, D., Goulet, J., Preisig, M., Fenton, B., Zhang, H., O'Malley, S., & Rounsaville, B. (1998). Familial transmission of substance abuse disorders. *Archives of General Psychiatry, 55*, 973–979.
- Metz, G. J. (1995). Substance abuse prevention in rural areas: Project Life. *Alcoholism Treatment Quarterly, 12*(3), 121–130.
- Miller-Heyl, J., MacPhee, D., & Fritz, J. J. (1998). DARE to be you: A family-support, early prevention program. *Journal of Primary Prevention, 18*(3), 257–258.
- Minnesota Council on Compulsive Gambling. (1997). *Wanna Bet? A curriculum designed to teach teens how to think critically about gambling*. Duluth: MN: North American Training Institute.
- Mohr, A. F. (2000). Adolescent substance abuse: Vulnerability and protective factors from a developmental perspective. *Dissertation Abstracts International, A 1 60*(7–A), 2373.
- National Gambling Impact Study Commission (1999). National Gambling Impact Study Commission: Final Report. Chicago: National Opinion Research Center.
- National Institute of Public Health Series on Gambling. (1999, May). *Gambling and Problem Gambling in Sweden*. (Report No. 2). Sweden: Ronnberg, R., Volberg, R. Abbott, M., Moore, W.L., Andren, A., Murck, I., Jensson, J., Nilssen, T., & Svenssen, O.
- National Research Council (1999). *Pathological gambling: A critical review*. Washington, D.C.: National Academy Press.
- Needle, R. H., Su, S. S., & Doherty, W. J. (1990). Divorce, remarriage, and adolescent substance use: A prospective longitudinal study. *Journal of Marriage and the Family, 52*, 157–169.
- Noble, E. P. (2000). Addiction and its reward process through polymorphisms of the D-sub-2 dopamine receptor gene: A review. *European Psychiatry, 15*(2), 79–89.
- Nova Scotia Department of Health. (1997). *Drawing the Line: A resource for the prevention of problem gambling. Volume 2, Senior High*. Nova Scotia: Problem Gambling Services, Nova Scotia Department of Health.
- Nower, L., Gupta, R., & Derevensky, J. (2000, June). Youth gamblers and substance abusers: A comparison of stress-coping styles and risk-taking behavior of two addicted adolescent popula-

- tions. Paper presented at the 11<sup>th</sup> International Conference on Gambling and Risk-Taking, Las Vegas.
- Nurco, D. N., Kinlock, T. W., O'Grady, K. E., & Hanlon, T. E. (1996). Early family adversity as a precursor to narcotic addiction. *Drug & Alcohol Dependence*, 43 (1-2), 103-113.
- Olds, D.L., Henderson, C. R., Chamberlin, R., & Tatelbaum R. (1988). Improving the life-course development of socially disadvantaged mothers: A randomized trial of nurse home visitation. *American Journal of Public Health*, 78, 1436-1445.
- Omnifacts Research Limited. (1993, May). *An examination of the prevalence of gambling in Nova Scotia* (Research Report Number 93090 for the Nova Scotia Department of Health, Drug Dependency Services). Halifax, Nova Scotia: Author.
- Palinkas, L. A., Atkins, C. J., Miller, C., & Ferreira, D. (1996). Social skills training for drug prevention in high-risk female adolescents. *Preventive Medicine*, 25, 692-701.
- Palmgreen, P., Lorch, E. P., Donohew, L., Harrington, N. G., DeSilva, M. & Helm, D. (1995). Reaching at-risk populations in mass media drug abuse prevention campaigns: Sensation seeking as a targeting variable. *Drugs and Society*, 8 (3/4), 29-46.
- Pentz, M. A., Trebow, E. A., Hansen, W. B., MacKinnon, D. P., Dwyer, J. H., Johnson, C. A., Flay, B. F., Daniels, S., & Cormack, C. C. (1990). Effects of program implementation on adolescent drug use behavior: The Midwestern prevention project (MPP). *Evaluation Review*, 14, 264-289.
- Perry, C. L., Williams, C. L., Komro, K. A., Veblen-Mortenson, S., Forster, J. L., Bernstein-Lachter, R., Pratt, L. K., Dudovitz, B., Munson, K. A., Farbakhsh, K., Finnegan, J., & McGovern, P. (2000). Project Northland high school interventions: Community action to reduce adolescent alcohol use. *Health Education & Behavior*, 27(1), 29-49.
- Peterson, A. V., Kealey, K. A., Mann, S. L., Marek, P. M., & Sarason, I. G. (2000). Hutchinson smoking prevention project: long-term randomized trial in school-based tobacco use prevention-results on smoking. *Journal of the National Cancer Institute*, 92(24), 1979-1991.
- Peterson, P. L., Hawkins, J. D., Abbott, R. D., & Catalano, R. F. (1994). Disentangling the effects of parental drinking, family management, and parental alcohol norms on current drinking by Black and White adolescents. *Journal of Research on Adolescence*, 4, 203-227.
- Pettit, G. S., Bates, J. E., & Dodge, K. A. (1997). Supportive parenting, ecological context, and children's adjustment: A seven-year longitudinal study. *Child Development*, 68(5), 908-923.
- Prescott, C. A., & Kendler, K. S. (1999). Genetic and environmental contributions to alcohol abuse and dependence in a population-based sample of male twins. *American Journal of Psychiatry*, 156(1), 34-40.
- Reese, F. L., Chassin, L., & Molina, B. (1994). Alcohol expectancies in early adolescents: predicting drinking behavior from alcohol expectancies and parental alcoholism. *Journal of Studies on Alcohol*, 55, 276-84.
- Reilly, D. M. (1979). Family factors in the etiology and treatment of youthful drug abuse. *Family Therapy*, 11, 149-171.
- Reznick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J. Tabor, J., Beunring, T., Sieving, R. E., Shew, M., Ireland, M., Bearinger, L. H., & Udry, J. R. (1997). Protecting adolescents from harm: Findings from the national longitudinal study on adolescent health. *Journal of the American Medical Association*, 278(10), 823-32.
- Robinson, J. L. (2000). Are there implications for prevention research from studies of resilience? *Child Development*, 71(3), 570-572.
- Rogers, A. M., & Taylor, A. S. (1997). Intergenerational mentoring: A viable strategy for meeting the needs of vulnerable youth. *Journal of Gerontological Social Work*, 28(1-2), 125-140.
- Rutter, M. (1987). Psychosocial resilience and protective mechanism. *American Journal of Orthopsychiatry*, 57, 316-331.
- Rutter, M. (1990). Psychosocial resilience and protective mechanisms. In J. Rolf, A. S. Masten, D. Cicchetti, K. H. Nuechterlein, & S. Weintraub (Eds.), *Risk and protective factors in the development of psychopathology* (pp. 181-214). New York: Cambridge.
- Sampson, R. J. (1986). Crime in cities: The effects of formal and informal social control. In A. J. Reiss & M. Tonry (Eds), *Crime and justice: An annual review of research: Vol. 8. Communities and crime* (pp. 271-311). Chicago: University Press.
- Schinke, S. P., Cole, K. C., & Orlandi, M. (1991). *The effects of boys and girls clubs on alcohol and drug use and related problems in public housing*. Unpublished final research report.

- Schinke, S. P., Orlandi, M.A., & Cole, K. C. (1992). Boys and girls clubs in public housing developments: Prevention services for youth at risk. *Journal of Community Psychology, OSAP Special Issue*, 118–128.
- Seitz, V., Rosenbaum, L. K., & Apfel, N. H. (1985). Effects of family support intervention: A ten-year follow-up. *Child Development, 56*, 376–391.
- Shaffer, H. J., & Hall, M. N. (1996). Estimating prevalence of adolescent gambling disorders. A quantitative synthesis and guide toward standard gambling nomenclature. *Journal of Gambling Studies, 12*, 193–214.
- Shaffer, H. J., Hall, M. N., & Vander Bilt, J. (1996). *Probability, statistics, and number sense in gambling and everyday life: A contemporary mathematics curriculum*. Billerica, MA: Harvard Medical School Division on Addictions and the Massachusetts Council on Compulsive Gambling.
- Shedler, J., & Block, J. (1990). Adolescent drug use and psychological health. *American Psychologist, 45*, 612–613.
- Shope, J. T., Copeland, L. A., Kamp, M. E., & Lang, S. W. (1998). Twelfth grade follow-up of the effectiveness of a middle school-based substance abuse prevention program. *Journal of Drug Education, 28*(3), 185–197.
- Solomon, D., Battistich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six-district study of educational change: Direct and mediated effects of the child development project. *Social Psychology of Education, 4*(1), 3–51.
- Spoth, R., Yoo, S., Kahn, J. H., & Redmond, C. (1996). A model of the effects of protective parent and peer factors on young adolescent alcohol refusal skills. *Journal of Primary Prevention, 16*(4), 373–394.
- St. Pierre, T. L., & Kaltreider, D. L. (1997). Strategies for involving parents of high-risk youth in drug prevention: A three year longitudinal study in boys & girls clubs. *Journal of Community Psychology, 25*(5), 473–485.
- St. Pierre, T. L., Mark, M. M., Kaltreider, D. L., & Aikin, K. J. (1992). Drug prevention in a community setting: A longitudinal study of the relative effectiveness of a three-year primary prevention program in Boys & Girls Clubs across the nation. *American Journal of Community Psychology, 20*(6), 673–706.
- St. Pierre, T. L., Mark, M. M., Kaltreider, D. L., & Aikin, K. J. (1997). Involving parents of high-risk youth in drug prevention: A three-year longitudinal study in boys & girls clubs. *Journal of Early Adolescence, 17*(1), 21–50.
- Stinchfield, R. (2000). Gambling and correlates of gambling among Minnesota public school students. *Journal of Gambling Studies 16*(2–3), 153–173.
- Strader, T. N., Collins, D. A. & Noe, T. D. (2000). *Building healthy individuals, families, and communities: Creating lasting connections*. New York: Kluwer Academic Publishers.
- Sullivan, T. N., & Farrell, A. D. (1999). Identification and impact of risk and protective factors for drug use among urban African American adolescents. *Journal of Clinical Child Psychology, 28*(2), 122–136.
- Svendsen, R. (1998). Gambling among older Minnesotans. Prepared for the National Research Council Committee on the Social and Economic Impact of Pathological Gambling. Minnesota: Minnesota Institute of Public Health.
- Svendsen, R. *Deal Me In: Gambling Trigger Videos and Posters*. Minnesota: Minnesota Department of Human Services.
- Svendsen, R., & Griffin, T. (1994). *Improving your odds: A curriculum about winning, losing and staying out of trouble with gambling*. Anoka, MN: Minnesota Institute of Public Health.
- Tabakoff, B., & Hoffman, P. L. (1988). Genetics and biological markers of risk for alcoholism. *Public Health Reports, 103*, 690–698.
- Taber, J. L., Russo, A. M., Adkins, B. J., & McCormick, R. A. (1986). Ego strength and achievement motivation in pathological gamblers. *Journal of Gambling Behavior, 2*, 69–80.
- Tarter, R. E., & Vanyukov, M. (1999). Re-visiting the validity of the construct of resilience. In M. D. Glantz & J. L. Johnson (Eds.), *Resiliency and development: Positive life adaptations* (pp. 85–100). New York: Plenum.
- Tarter, R. E., Vanyukov, M., Giancola, P., Dawes, M., Blackson, T., Mezzich, A., & Clark, D. B. (1999). Etiology of early age onset substance use disorder: A maturational perspective. *Development & Psychopathology, 11*(4), 657–683.

- Taylor, A. S., LoSciuto, L., Fox, M., Hilbert, S. M., & Sonkowsky, M. (1999). The mentoring factor: Evaluation of the across ages' intergenerational approach to drug abuse prevention. *Child & Youth Services, 20*(1-2), 77-99.
- Thomas, G., Reifman, A., Barnes, G. M., & Farrell, M. P. (2000). Delayed onset of drunkenness as a protective factor for adolescent alcohol misuse and sexual risk-taking: A longitudinal study. *Deviant Behavior, 21*(2), 181-210.
- Tierney, J. P., Grossman, J. B., & Resch, N. L. (1995). *Making a difference: An impact study of Big Brothers/Big Sisters*. Philadelphia, PA: Public/Private Ventures.
- Tremblay, R., Kurtz, L., Masse, L. C., Vitaro, F., & Pihl, R. O. (1994). A bimodal preventive intervention for disruptive kindergarten boys: Its impact through mid-adolescence. Unpublished manuscript. Montreal: University of Montreal Research Unit on Children's Psycho-Social Maladjustment.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology, 5*(2), 207-232.
- Vitaro, F., Ferland, F., Jacques, C., & Ladouceur, R. (1998). Gambling, substance use, and impulsivity during adolescence. *Psychology of Addictive Behaviors, 12*(3), 185-194.
- Volberg, R. A. (1994). The prevalence and demographics of pathological gamblers: Implications for public health. *American Journal of Public Health, 84*(2), 237-241.
- Von Knorring, L., & Von Knorring, A. L. (1987). Personality traits and platelet MAO activity in alcohol and drug abusing teenage boys. *Acta Psychiatrica Scandinavica, 75*, 307-314.
- Waddington, C. H. (1942). Canalization of development and the inheritance of acquired characters. *Nature, 150*, 563-564.
- Waddington, C. H. (1957). *The strategy of genes*. London: Allen and Unwin.
- Wagenaar, W. A. (1970). Subjective randomness and the capacity to generate information. *Acta Psychologica, 33*, 233-242.
- Wagenaar, W. A. (1988). *Paradoxes of gambling behaviour*. Hove, England: Lawrence Erlbaum Associates, Inc.
- Walker, D. M., & Barnett, A. H. (1999). The social costs of gambling: An economic perspective. *Journal of Gambling Studies 15*(3), 181-212.
- Wallisch, L. S. (1993). *Gambling in Texas: 1992 Texas survey of adolescent gambling behavior*. Austin, TX: Texas Commission on Alcohol and Drug Abuse.
- Werch, C. E., Pappas, D. M., Carlson, J. M., Edgemon, P., Sinder, J. A., & DiClemente, C. C. (2000). Evaluation of a brief alcohol prevention program for urban school youth. *American Journal of Health Behavior, 24*(2), 120-131.
- Werner, E. E. (1986). Resilient offspring of alcoholics: A longitudinal study from birth to age 18. *Journal of Studies on Alcohol, 47*, 34-40.
- Werner, E. E. (1989). High risk children in young adulthood: A longitudinal study from birth to 32 years. *American Journal of Orthopsychiatry, 59*, 72-81.
- Werner, E. E., & Smith, R. S. (1982). *Vulnerable but invincible: A study of resilient children*. New York: McGraw-Hill.
- Windle, M., Shope, J. T., & Bukstein, O. (1996). Alcohol use. In R. DiClemente & Hansen Bunker et al. (Eds.), *Handbook of adolescent health risk behavior*. Issues in clinical child psychology (pp. 115-159). New York, NY, USA: Plenum Press.
- Winters, K. C., & Anderson, N. (2000). Gambling involvement and drug use among adolescents. *Journal of Gambling Studies, 16*(2-3), 175-198.
- Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1990). Adolescent survey of gambling behavior in Minnesota: A benchmark. Report to the Department of Human Services Mental Health Division. Duluth, MN: Center for Addiction Studies University of Minnesota.
- Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993). Patterns and characteristics of adolescent gambling. *Journal of Gambling Studies, 9*(1), 371-386.
- Wood, R., & Griffiths, M. (1998). The acquisition, development and maintenance of lottery and scratchcard gambling in adolescence. *Journal of Adolescence, 21*, 265-272.
- Wood, R., & Griffiths, M. (2000). Risk factors in adolescence: The case of gambling, videogame playing, and the internet. *Journal of Gambling Studies, 19*(2/3), 199-225.
- Wynne, H. J., Smith, G. J., & Jacobs, D. F. (1996). *Adolescent gambling and problem gambling in Alberta*. Alberta, Canada: Alberta Alcohol and Drug Abuse Commission.

- Younoszai, T. M., Lohrmann, D. K., Seefeldt, C. A., & Greene, R. (1999). Trends from 1987 to 1991 in alcohol, tobacco, and other drug (ATOD) use among adolescents exposed to a school district-wide prevention intervention. *Journal of Drug Education*, 29(1), 77–94.
- Zastowny, T. R., Adams, E. H., Black, G. S., & Lawton, K. B. (1993). Sociodemographic and attitudinal correlates of alcohol and other drug use among children and adolescents: Analysis of a large-scale attitude tracking study. *Journal of Psychoactive Drugs*, 25(3), 223–237.
- Zimmerman, M. A., Meeland, T. , & Krug, S. E. (1985). Measurement and structure of pathological gambling behavior. *Journal of Personality Assessment*, 49(1), 76–81.
- Zitzow, D. (1993, July). Incidence and comparative study of compulsive gambling behaviors between Indian and non-Indians within and near a northern plains reservation. Unpublished manuscript. Bemidji, MN: Indian Health Service, Bemidji Area Office. Paper presented at The Third National Conference on Gambling Behavior, New London, CT.
- Zuckerman, M. (1987). Biological connection between sensation seeking and drug abuse. In J. Engel & L. Oreland (Eds.), *Brain reward systems and abuse* (pp. 165–176). New York: Raven Press.

Received April 27, 2001; final revision August 6, 2001; accepted September 27, 2001.