

PHASE I –REPORT

MEASURING PROBLEM GAMBLING IN ADOLESCENT POPULATIONS



CANADIAN CENTRE ON SUBSTANCE ABUSE

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February 2005



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INTRODUCTION

1.1 BACKGROUND

Over the past decade, a considerable amount of research has been conducted on adolescent gambling and problem gambling. While there is general consensus in the literature that adolescents do gamble and that some develop problems from their gambling, there is less agreement regarding the prevalence of adolescent problem gambling (e.g. Ladouceur, 2001; Ladouceur et al., 2000; Stinchfield, 2000b). Estimates have ranged from as low as 2.3% to as high as 21% (see McGowan, Droessler, Nixon, & Grimshaw, 2000), with one meta-analysis of North American research estimating between 9.9% and 14.2% of adolescents to be at-risk of developing gambling problems, and between 4.4% and 7.4% to already be exhibiting gambling problems. Not only do estimates of adolescent problem gambling rates vary, they are also much higher than estimates reported for adults; indeed, approximately 2 to 5 times higher.

Why have prevalence estimates of adolescent problem gambling varied so widely, and why have some estimates been so much higher than those reported for adults? While this question cannot be answered unequivocally at the present time, many believe it may have something to do with the way the adolescent problem gambling construct has been conceptualized, operationally defined, and measured. In the extensive National Research Council (1999) study of pathological gambling in the United States, for instance, the committee noted the problem of accurately assessing the extent of adolescent problem gambling as follows:

The committee estimates that, in a given year, as many as 1.1 million adolescents between the ages of 12 and 18 are pathological gamblers. However, the committee recognizes that adolescent measures of pathological gambling are not always comparable to adult measures and that different thresholds for adolescent gambling problems may exist. Given various ways in which pathological gambling has been operationalized in prevalence studies among adolescents, this estimate should be viewed with caution. (p.3)

In an issue of *The Wager* (2002), the editors comment on Jacobs' (2000) meta-analysis of 20 adolescent gambling studies conducted between 1984 to 1999 stating:

Given the preponderance of evidence, perhaps the most careful opinion on this matter was offered by the National Research Council when they concluded that variation in methods, instrumentation, and conceptualization might influence findings and therefore it is not yet possible to draw confident conclusions about the rate of gambling disorders among adolescents (p.2).

Finally, in her assessment of the validity and reliability of the SOGS-RA for measuring

problem gambling among a sample of over 13,000 Atlantic Canadian adolescents, Poulin (2002) concluded that:

Regarding criterion validity, there is an urgent need to perform the types of enquiry that will allow clarification about how adolescent problem gambling is conceptualized, by adults versus adolescents, by males versus females, and from a clinical versus a public or population health perspective. (p.91)

Notwithstanding that there is a rich repository of adolescent gambling research that has accumulated over the past decade, then, the above findings and conclusions suggest that the relatively high and variable rates of adolescent problem gambling reported in the literature may be due to limitations with the current conceptualization, operational definition, and measurement of the adolescent problem gambling construct. As a result, they point to a critical need that exists for a new conceptualization and operational definition, and for a new, psychometrically sound instrument that will render more reliable and valid adolescent problem gambling prevalence estimates. It is the purpose of the present research to begin to address this need.

1.2 OBJECTIVES

The research is a collaborative, two-phase initiative of 7 funding organizations—six provincial and one federal. The objectives of Phase I, the focus of the present report, are to:

1. Reconceptualize the adolescent problem gambling construct,
2. Establish an operational definition of the construct that will guide development of a new survey instrument for identifying adolescent problem gamblers in the general population, and
3. Develop an initial version of the new survey instrument for adolescents 12 to 17 years of age, provisionally called the Adolescent Problem Gambling Instrument (APGI).

The objective of Phase II, to be initiated in mid-2005, is to test the reliability and validity of the instrument developed in Phase I.

1.3 SIGNIFICANCE

The overall significance of the present research is that it will allow for more reliable and valid estimates of adolescent problem gambling prevalence. After all, a primary mandate of the research community is not only to describe public health problems, but to describe them accurately. Once we have more accurate descriptions, they can then be used to help refine public policy, prevention, and treatment initiatives. In more specific terms, the present research is significant in the following ways:

1. The task of *reconceptualizing* the adolescent problem gambling construct will help consolidate our understanding of adolescent problem gambling by

critically reviewing some of the main theoretical perspectives in the field, including some relatively new and promising models (e.g., Chambers and Potenza's model of neurodevelopmental change). It will also help illuminate the relationship between adolescent problem gambling, other key constructs (e.g., impulsivity, emotion regulation, etc.), and adolescent mental health problems more generally.

2. Establishing an *operational definition* of adolescent problem gambling will serve both the present and subsequent research, in that it will prescribe the principal domains, variables, and items of the adolescent problem gambling construct that will ultimately be measured. It will also advance the understanding of, and response to, adolescent problem gambling by stimulating ongoing discussion and debate.
3. Developing a *reliable and valid instrument* for measuring adolescent problem gambling will be of significance both to prevention and treatment initiatives in particular, and to the study of adolescent problem gambling in general. First, a number of relatively recent Canadian studies conducted among adults have shown that 18-24 year olds have the highest rates of problem gambling—nearly double the rates reported for the general adult gambling population. With a new, psychometrically sound survey instrument for measuring adolescent problem gambling, we will be able to determine the nature and extent of problem gambling in the “feeder” population just below the 18-24 cohort (i.e., adolescents). Given that today's youth are the first to grow up in a society where legalized gambling is widely available, marketed, and condoned, we believe this contribution is extremely important. Second, the new survey instrument will enable population health researchers to establish baseline rates of adolescent problem gambling, monitor changes in these rates over time, and compare rates across jurisdictions. It will also allow investigators to *aggregate* findings to create a more robust profile of adolescent problem gambling than is currently available. This baseline profile can then be used to monitor trends in problem gambling from adolescence to early adulthood over time. Finally, as discussed above, with a more reliable and valid instrument for measuring problem gambling in adolescent populations, we will be able to establish more credible prevalence estimates which can then be used to help shape public and health policy initiatives.

1.4 OVERVIEW

The present report is divided into 5 chapters. The first chapter, which we just reviewed, covered the background, objectives, and significance of our research. In Chapter 2, we discuss methodology, looking at the specific questions guiding our research, the types of data being used to answer these questions, and some possible research limitations. Chapter 3 reviews the scientific literature on adolescent problem gambling, substance use, and general risk-taking, looking specifically at terms, definitions, classifications, conceptual models and/or correlates of these behaviours. It is hoped that this review will provide important insights for the particular objectives of our research. In Chapter 4, we identify the instruments most commonly used to

measure adolescent problem gambling, and discuss in more detail the limitations of these measures and of adolescent problem gambling measurement in general that may account for some of the relatively high and variable prevalence estimates we mentioned earlier in this chapter. In Chapter 5, we consider the implications of the literature review and adolescent problem gambling measurement limitations discussed in chapters 3 and 4 for our own conceptual framework, operational definition, and measure of adolescent problem gambling. We then present the conceptual framework and operational definition. The next immediate step is to draft the survey instrument based on feedback on the proposed conceptual framework and operational definition.

METHODOLOGY

2.1 RESEARCH QUESTIONS

As stated in Chapter 1, the main objectives of the present research are to reconceptualize the adolescent problem gambling construct, establish an operational definition that will guide development of a new survey instrument for measuring the construct in adolescent populations, and develop an initial version of the new measurement instrument. To meet these objectives, the research is being directed by the following specific research questions:

1. What conceptualizations, theoretical perspectives, and/or research findings have been used to describe and explain adolescent problem gambling?
2. What research findings have been used to describe and explain other adolescent risk behaviour (e.g., substance use, general risk-taking)?
3. What are the main instruments that have been used to identify problem gamblers in adolescent populations, and what are the limitations of these instruments and of problem gambling measurement in general?
4. Of the above conceptualizations, theoretical perspectives, research findings, and/or measurement instruments and limitations, what are the implications for our conceptualization, operational definition, and new measure of adolescent problem gambling?

2.2 DATA SOURCES AND COLLECTION

In order to answer the above research questions, two main sources of data are being used: (1) the scientific literature that describes and explains adolescent problem gambling, substance use, and general risk-taking, and (2) various key informant groups. These are each described below.

2.2.1 Scientific Literature Review

For our review of the scientific literature, searches were confined to electronic resources that included library catalogues, bibliographic databases, and specialized web site collections (see Table 1). With few exceptions, searches were limited to articles published between January 1990 and January 2004, although some unpublished reports and articles *in press* were also included. Types of documents searched included journal articles, book chapters, policy papers, conference papers, and other reports. Keywords used in the two literature searches are presented in Appendix A. The research uncovered by the searches is provided in a companion document

entitled, *An Annotated Bibliography of Youth Gambling and Problem Gambling & Related Literature in Substance Abuse, Risk-Taking & Youth Development*.

Table 1. *Library catalogues, databases, and specialized web site collections used in literature searches*

Library Catalogues	Databases	Web Site Collections
Library of Congress	ASSIA	Youth Gambling International
University of Alberta	ERIC	Project CORK
University of Toronto	Ingenta; LOCATORplus; NLM Gateway; PsycINFO; Medline; Science Direct; Social Science Abstracts; Social Sciences Citations Index; Social Work Abstracts; Sociological Abstracts; Web of Knowledge	

2.2.2 Key Informant Groups

In addition to the scientific literature, the research questions guiding the present report are being answered with the help of four key informant groups. These include: (1) eminent researchers in the fields of adolescent problem gambling, substance use, risk-taking, and general adolescent behaviour, (2) clinicians/therapists who treat adolescents with mental health disorders, particularly problem gambling and other addictions; (3) youth workers who counsel troubled adolescents, including adolescents with gambling problems¹; and (4) adolescent gamblers themselves. Given the diversity of these groups, it is expected they will each be able to provide different, yet equally important, insights for the present inquiry. For a detailed look at the specific number of individuals in each of the groups, the type of information sought from them, and the method used to collect this information, please see Table 2 below.

¹ A snowball sampling technique will be used to select clinicians/therapists and youth workers from diverse locales so that the insights they provide will be based on a broad range of experiences.

Table 2. *Description of key informant groups, information sought, and data collection methods*

Group (Size)	Group Description	Information Sought	Information Collection Method
Researchers (20)	- Expert in the fields of adolescent problem gambling, substance use, risk-taking, and general adolescent behaviour	- Identification of most relevant literature, theories, and conceptualizations related to adolescent behaviour - Feedback on content of conceptual framework, operational definition, and measurement instrument	- Dedicated website to post questionnaire, conceptual framework, operational definition, and measurement instrument
Clinicians/ Therapists (10)	- Specialize in treating adolescents with mental health disorders, particularly problem gambling and other addictions	- Insights into adolescent behavioural, cognitive, emotional and gambling disorders - Feedback on content of conceptual framework, operational definition, and measurement instrument	- Dedicated web site to post questionnaire, conceptual framework, operational definition, and measurement instrument
Youth Workers (10)	- Specialize in counselling troubled adolescents, including adolescents with gambling problems and other addictions	- Insight into adolescent behaviours, cognitions, emotions, risk-taking, and recreational pursuits, including gambling - Feedback on content of conceptual framework, operational definition, and measurement instrument	- Dedicated web site to post questionnaire, conceptual framework, operational definition, and measurement instrument
Adolescents (40)	- Gamblers 12 - 17 years of age from Ontario and Quebec	- Beliefs, attitudes, and values related to risk-taking, including gambling - Definition of gambling, importance of gambling as a leisure activity, and perceptions of problem gambling	- Research firm to conduct 4 focus groups of 10 adolescents: 2 groups of 12-14 year olds, 2 groups of 15-17 year olds²

² Given that there may be differences in attitudes and behaviors between younger and older adolescents, the focus groups are being stratified by age.

2.3 LIMITATIONS

There are at least two possible limitations to the present research that should be acknowledged. First, while the purpose of the research is to reconceptualize, operationally define, and ultimately develop a new instrument for measuring adolescent problem gambling, it is not entirely clear that a disorder nominally labelled “adolescent problem gambling” actually exists. That is, it may be that severe impulsivity, risk-taking, and/or some other construct are the “real” disorder(s), and that adolescent problem gambling is merely a manifestation of one or more of these. Even if adolescent problem gambling is not its own distinct disorder, however, it does not negate the fact that many adolescents still do experience a variety of negative consequences from their gambling. As such, the significance of the present research cannot be disputed, as it is ultimately designed to develop a valid and reliable measure that will help identify adolescents who are experiencing problems as a result of their gambling.

Second, in the social sciences, the method of self-report is often criticized for being open to subjective interpretation, distortion of facts, and other kinds of bias that make it difficult to obtain an “objective” view of reality. Insofar as the present research relies on adolescents’ self-reports, it too suffers from such a limitation. As discussed earlier, however, in addition to the insights provided by adolescent gamblers themselves in the present research, the perceptions of up to 40 adolescent researchers, clinicians/therapists, and youth workers are also being taken into consideration. When combined with the literature reviewed in the next chapter, we believe any potential problems that may arise from using adolescents’ self-reports in this research will be greatly diminished.

LITERATURE REVIEW

3.1 PROBLEM GAMBLING

We begin our review of the scientific literature by looking at research on problem gambling, starting with *Terms, Definitions, and Classifications*, moving on to *Conceptual Models*, and ending with *Correlates*. Because very little exists on *Terms, Definitions, and Classifications* of adolescent problem gambling specifically, this section will draw largely on ideas that have been put forward for adults.

3.1.1 Terms, Definitions, and Classifications

Terms

A variety of terms have been used to describe problem gambling, including *compulsive*, *pathological*, *probable pathological*, *disordered*, *Level 3*, *excessive* and *problem* (Blaszczynski & Nower, 2002; Cunningham-Williams & Cottler, 2001; Productivity Commission, 1999). For purposes of the present review, the term *problem* will be used. A number of terms have also been used to describe the continuum of problem gambling (see Cunningham-Williams & Cottler, 2001). There are social or recreational gamblers, for instance, who do not necessarily experience consequences related to their gambling, but who nevertheless exhibit *at risk* gambling behaviour. Similarly, among problem gamblers there is a range of problem gambling severity, from those who experience one or two characteristics of problem gambling to those who experience *moderate* level problems and *severe* level problems.

Definitions

There is no single definition of problem gambling. Some definitions focus on observable gambling behaviour (e.g., chasing losses), some on psychological features (e.g., loss of control), some on negative consequences (e.g., bankruptcy), and some on a combination of two or more of these (see Productivity Commission, 1999). In the most recent edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), pathological gambling is defined as "persistent and recurrent maladaptive gambling behaviour" meeting five or more of the following criteria: preoccupation with gambling, needing to gamble with increasing amounts of money, repeated unsuccessful attempts to control gambling, feelings of restlessness or irritability when trying to control gambling, gambling to escape problems, chasing losses, lying to family members, committing illegal acts, jeopardizing significant relationships, and relying on others to relieve a desperate financial situation (American Psychiatric Association, 1994).

Classifications

Over the past 25 years, there has been some uncertainty over how pathological gambling should be classified. Since 1980, the American Psychiatric Association has formally recognized pathological gambling as a disorder of *impulse control*, even though the criteria it uses for diagnoses are actually modeled after those used for substance use disorders (e.g., tolerance and withdrawal symptoms). As Shaffer and colleagues (2003) note, the decision to classify pathological gambling as an impulse disorder is likely related to the fact that the DSM-IV has no classification for addiction disorders *per se*. In addition to being considered as an impulse control and addictive disorder, pathological gambling has also been categorized as a heterogeneous disorder—with some subtypes representing an obsessive-compulsive disorder, and some subtypes representing something closer to a substance use disorder (Blanco, Moreyra, Nunes, Saiz-Ruiz, & Ibanez, 2001).

The above classifications view problem gambling from the perspective of the medical model. Several investigators, however, have called into question the appropriateness of this approach. As noted by the Productivity Commission (1999), problem gamblers do not always show the same patterns of behaviour nor experience clearly defined symptoms indicative of a distinct mental illness. They also do not necessarily get progressively worse—there is continuum of problem gambling severity and many gamblers improve to less problematic levels, even without the aid of formal treatment. Finally, problem gamblers' behaviour may be influenced by the social environment in which they live, a factor that tends to be ignored by the medical model.

3.1.2 Conceptual Models

General Theory of Addictions

Jacobs formulated a general theory of addictions which stemmed from the pathological gambling field (Jacobs, 1986, 1987, 1988, 1989a, 1993). This theory incorporates ideas from both the biological and psychological disciplines, and is intended to explain all addictions. The theory holds that there are two underlying and interacting conditions that cause discomfort for an individual, which in turn leads to self-medication through engaging in addictive behavior. The first condition is a *physiological resting state* whereby the individual is chronically over-, or under-, stimulated. The second is a *psychological problem* (e.g., rejection, insecurity) that creates considerable psychological pain. In order to escape from the discomfort caused by these two factors, the individual engages in addictive behavior.

Support for Jacobs' theory comes from a study conducted by Gupta and Derevensky (1998a) on high school students. First, the study found that problem and pathological adolescent gamblers reported greater levels of dissociation, emotional distress, and comorbidity with other addictive behaviours, as well as abnormal physiological resting states. Second, the study revealed strong relationships between physical and emotional predispositions to escape and problem gambling severity. Third, the study found important differences between males and females: Young males appeared more likely to be predisposed to a gambling problem as a result of hyper-arousal (excitability), whereas depression, boredom, and a desire to escape were more

likely to predispose young females. (These gender differences, however, may need to be viewed with caution, given the relatively small number of female problem gamblers in this study.)

Adolescent Risk Behaviour Model

Many investigators have observed that the risk factors related to adolescent problem gambling are the same ones related to other risk-taking behaviour (e.g., alcohol and drug use), including family history, low self-esteem, depression, family norms, physical or sexual abuse, poor school performance, delinquency, community norms and early onset of problem behaviours (Dickson, Derevensky, & Gupta, 2002). Similar to Jacobs who views all addictions as arising from the same general source, these investigators have suggested that problem gambling be incorporated into a general *adolescent risk behaviour model* whereby all risk-taking activity is viewed as being due to the same underlying condition (Derevensky, Gupta, & Winters, 2003). Dickson et al. (2002) conceptualized adolescent problem gambling within such a risky-behaviour paradigm, wherein different problems represent different manifestations of the same underlying deviant orientation. In this perspective, risk behaviours are not singular, but instead constitute a “syndrome” of behaviours sharing a common basis (Barnes, Welte, Hoffman, & Dintcheff, 2002; Vitaro, Brendgen, Ladouceur, & Tremblay, 2001); conceptually, if an adolescent engages in one risky behaviour, he or she is more likely to engage in another risky behaviour, as compared to an adolescent who does not engage in the original risky behaviour at all.

Dickson and her colleagues (2002) advanced their perspective further and presented an adaptation of Jessor’s (1998) adolescent risk behaviour model that suggests problem gambling be viewed as a form of adolescent risky behaviour with health and life-compromising outcomes. According to the model, some factors increase the adolescent’s risk of developing a behavioural or lifestyle problem, while other factors protect the adolescent from doing so. Both sets of factors are grouped within the five domains of biology/genetics, social environment, perceived environment, personality, and behaviour. Based on their review of the empirical literature, Dickson et al. (2002) conclude that of the factors that increase the adolescent’s risk of engaging in problem behaviour, some are unique to adolescent problem gambling, while some are common to both problem gambling and other adolescent problem behaviours. They may each be seen in Table 3.

Table 3. *Risk factors unique to adolescent problem gambling (APG), and common to APG and other problem behaviours*

Risk Factors Unique to APG	Risk Factors Common to APG & Other Problem Behaviours
Access to gambling venues	Being male
Depression and anxiety	High risk-taking propensity
Early onset of gambling experiences	Low self-esteem
High extroversion	Models for deviant behaviour
Low conformity and self-discipline	Normative anomie
Paternal pathological gambling	Parent/Peer normative conflict
Persistent problem behaviour	Poor school work
Poor coping skills and adaptive behaviour	School difficulties

In addition to the risk factors found to be associated with adolescent problem gambling and other problem behaviours presented above, Dickson et al. (2002) point out that there are still further risk factors that have been shown to relate to other adolescent problem behaviours but have yet to be studied or confirmed for their relation to problem gambling. These include: family history of alcoholism, poverty, racial inequality, illegitimacy, opportunity, low perceived life chances, and problem drinking. Dickson et al. also note that some factors which might protect the individual from gambling problems have yet to be examined as well, including: high intelligence, family cohesiveness, interested adults, models for conventional behaviour, high controls against deviant behaviour, values placed on achievement and health, intolerance of deviance, church, neighbourhood resources, good quality schools, and attendance/involvement in school and clubs.

Model of Neurodevelopmental Change

While some investigators have viewed adolescent risk-taking as deviant, others have called attention to its normalcy. Chambers, Taylor and Potenza (2003), for instance, review evidence suggesting that the high rates of gambling, problem gambling, and other behaviours characterized by poor impulse control among adolescents are a result, in part, of normal neurobiological processes that take place during the adolescent period. They proposed a developmental model of neurocircuitry that holds:

...in the adolescent brain, relative to the adult brain, impulse-promoting substrates operate more robustly while those that inhibit impulse or appear involved directly in decision-making are not yet maximized. (p.76)

Thus, according to Chambers and Potenza (2003), the above set of circumstances may help to explain why adolescents are more likely than adults to act impulsively when making decisions to gamble, and why they may be less able to control their gambling urges. These circumstances do not necessarily represent abnormality or mental illness among adolescents, Chambers and Potenza argue, but rather may reflect normal and even evolutionary adaptive brain processes and

functions that optimize “experiential opportunities and learning mechanisms appropriate to the neurodevelopmental stage of the individual” (p.76). They point out, however, that even if impulsive decisions to gamble among adolescents are understandable and even “normal”, these individuals are still biologically vulnerable to problem gambling and other disorders characterized by poor impulse control.

Pathways Model

Most theoretical models of problem gambling tend to concentrate on either single variables or on a few mechanisms to explain the development of problem gambling. The limitation of these models is that they generally do not account for the heterogeneity that exists among problem gamblers, nor do they adequately account for the wide range of variables found to relate to problem gambling (e.g., psychological, biological, social, ecological, physiological, etc). As a result, there has been a move in recent times towards a more multifaceted explanation of problem gambling, an approach known as the *biopsychosocial model* (e.g. Blaszczynski & Nower, 2002; Griffiths and Delfabbro, 2001; Sharpe, 2002; Raylu & Oei 2002).

One variant of the biopsychosocial model is the empirically validated Pathways Model put forward by Blaszczynski and Nower (2002). According to this model, there are three discrete pathways that lead to three distinct sub-types of problem gamblers, and each pathway is associated with its own vulnerability factors, demographic features, and etiological processes, depending upon the specific biological and personality traits of the individual. Although the three pathways are discrete, they all begin with “ecological factors” (i.e., gambling availability and accessibility). They then advance with classical and operant conditioning (leading to increased and habitual gambling) and cognitive processes (leading to cognitive misperceptions about skill and probability) until a gambling problem develops. The pathways, along with their corresponding problem gambler sub-types, are as follows: *Pathway 1, behaviourally conditioned problem gamblers* (individuals who repeatedly exhibit poor judgment by engaging in destructive gambling behaviours but lack a specific psychiatric pathology); *Pathway 2, emotionally vulnerable problem gamblers* (individuals who experience gambling problems due to depression, anxiety or other emotional disorders); and *Pathway 3, antisocial impulsive problem gamblers* (individuals who engage in reckless and spontaneous gambling behaviour, and typically exhibit signs of antisocial personality disorder, emotional vulnerability, multiple addictions, and other comorbid psychiatric conditions).

Although the Pathways Model was originally developed to describe adult problem gamblers, Nower and Blaszczynski (2003) recently applied the model to adolescents. While the names of the pathways and problem gambling sub-types are the same, different clinical features and aetiologies are involved: Behaviourally conditioned problem gamblers are those who essentially lose control over gambling in response to the probability of a win. Emotionally vulnerable problem gamblers are those who gamble for emotional escape and mood regulation, suffer from emotional instability and stressful family histories, and have poor coping and problem solving skills. Antisocial impulsivist problem gamblers are those who begin gambling at an early age, have a biological vulnerability toward impulsivity and arousal-seeking, manifest attention deficits and antisocial characteristics, and are more likely to have co-morbid addictions. While

empirical research is still needed to validate this more recent version of the Pathways Model, it nevertheless offers a promising perspective of adolescent problem gambling.

3.1.3 Correlates

As discussed in Chapter 1, a considerable amount of research has been conducted on adolescent gambling and problem gambling in recent years. Aside from examining prevalence, this research has also investigated the factors that may increase, or decrease, an adolescent's risk of developing gambling problems. While there are many inconsistencies across studies (see Derevensky & Gupta, 2004a; Dickson et al., 2002; Rossen, 2001; Stinchfield, 2004; Stinchfield & Winters, 2004), a number of factors do emerge with sufficient empirical support to suggest they hold an important relationship to higher levels of problem gambling. They are each discussed below.

Individual Correlates

Male gender

Perhaps the strongest, most consistent, factor associated with adolescent problem gambling is male gender, as gambling participation and problem gambling have been found to be more common among males than females (Derevensky & Gupta, 2004a; Rossen, 2001; Stinchfield, 2000a; Volberg, 1994).

Earlier age of gambling initiation

In addition to being male, adolescent problem gamblers are more likely to have begun gambling earlier than non-problem gamblers (Derevensky & Gupta, 2004a; Rossen, 2001), at approximately 10 years of age (Derevensky & Gupta, 2004a).

Older age and participation in more formal types of gambling

As adolescents age, they are more likely to replace participation in “informal” gambling activities (e.g., coin flipping, skill games, sports betting) with more “formal” ones (e.g., lotteries, “scratch-cards” and EGMs). Research suggests it is these more formal types of activities in which problem gamblers are most likely to engage (see Rossen, 2001; Stinchfield, 2000a).

Participation in other risky activities and delinquency

Adolescent problem gamblers are more likely than their non-problem gambling counterparts to engage in other risk-taking activities (e.g., drugs, alcohol, cigarettes) as well as delinquent behaviour (e.g., crime, decreased school performance, antisocial behaviour) (Derevensky & Gupta, 2000a, Rossen, 2001).

Positive attitudes towards gambling and misunderstanding of odds, probabilities, and skill

Adolescents in general have a relatively positive attitude towards gambling, but the literature suggests that at-risk and problem adolescent gamblers are particularly accepting of this activity. They are more likely, for instance, to believe in a young person's right to gamble and that gambling is a harmless and important activity. They are also more likely to believe that more skill is involved in gambling than it actually is (Rossen, 2001), and to not fully understand the risks or odds associated with gambling (Derevensky & Gupta, 2004a; Rossen 2001). As a result, many adolescent problem gamblers believe that gambling is a good way to make money (Rossen, 2001).

Non-financial motivations for gambling

Despite its potential monetary reward, money is not the main reason why adolescents gamble, although it may become more of a reason for gambling as the behaviour continues (Derevensky & Gupta 2000a; Rossen, 2001). The main reason for gambling, it seems, is emotional: Adolescents generally gamble for fun, excitement, and/or for the visceral thrill (Derevensky & Gupta, 2004a; Rossen, 2001). Compared to their non-problem gambling counterparts, however, at-risk and problem adolescent gamblers are particularly likely to gamble for these reasons, as well as for the challenge, to socialize with friends, and to forget about/escape their problems (Gupta & Derevensky, 1998a; Wiebe, 1999).

Dissociative reactions while gambling

Adolescent problem gamblers frequently report experiencing dissociative reactions while gambling, such as losing track of time, feeling like a different person, being in a trance, blacking out, and feeling "outside" of themselves. Such reactions, they claim, offer an escape into another world where their problems seem to lessen (Rossen, 2001; Derevensky & Gupta, 2000a). In this vein, gambling may be seen as a coping mechanism of sorts that enables the adolescent to handle the adversities and stresses of life.

Greater excitability, impulsivity, and extroversion

Considerable evidence suggests that adolescent problem gamblers are more excitable, extroverted, and impulsive than are non-problem gamblers (Derevensky & Gupta, 2004a; Raylu & Oei, 2002). As a result, they are more likely to experience problems with self-discipline and conforming to societal norms (Derevensky & Gupta, 2004a).

Mental health problems, stress, poor coping skills, and suicidality

Compared to their non-problem gambling counterparts, adolescent problem gamblers have higher levels of depression and anxiety, lower levels of self-esteem, and experience more frequent daily hassles and major traumatic life events (e.g., abuse, neglect, and abandonment) (Rossen, 2001; Derevensky & Gupta, 2004a). At the same time, however, they have relatively poor general coping skills to deal with these negative feelings and stressors, a finding which may partly explain why adolescents with serious gambling problems are at greater risk of suicide ideation and attempts (Derevensky & Gupta, 2004a; Gupta & Derevensky, 1998a).

Ethnicity

Studies suggest that ethnicity may also play a role in problem gambling development. Based on her review of the literature, for instance, Rossen (2001) concluded that ethnic minorities seem to exhibit more problematic gambling behaviour than adolescents from non-minority groups.

Social, Environmental, and Other Correlates

Parental gambling and problem gambling

Research has consistently shown that problem gamblers are more likely to have parents who gamble, and, in particular, have gambling related problems (Carlson & Moore, 1998; Derevensky & Gupta, 2000a; Rossen, 2001). This strong familial connection is consistent with some early evidence suggesting genetics may play a role in problem gambling, although research has yet to rule out social learning and other non-genetic influences (Raylu & Oei, 2002).

Peer gambling and gambling associates

In general, adolescents tend to gamble with their peers, although this relationship may vary with gender, age, and the particular type of gambling activity engaged in (Rossen, 2001; Moore & Ohtsuka, 2000). For those with severe gambling problems, long-lasting friendships and relationships are often replaced by gambling associates (Derevensky & Gupta, 2004a).

A Note on Causality

While the literature reviewed above shows that there are a number of factors related to adolescent problem gambling, it says little about the nature of these relationships. That is, as Rossen (2001) reminds us, just because two variables are related does not necessarily mean that one causes the other. While depression has been found to correlate highly with problem gambling, for example, we do not know whether it is a cause of problem gambling, a result of problem gambling, and/or whether both depression and problem gambling are caused by some third, unknown factor. One possible way to shed light on causality is by conducting longitudinal studies. Although this type of research is relatively rare compared to the epidemiologically based research that is typically done in this area, some studies have nevertheless been conducted. In her review of the few Canadian and American longitudinal studies that have been done, Rossen (2001) concluded that the evidence thus far only provides strong support for *concurrent* relationships between certain variables and problem gambling, not *causal* relationships. It looks like the answers to the question of causality, then, will need to await further research.

3.1.4 Summary

There is currently no standard conceptualization of adolescent problem gambling. Not only do terms, definitions, and classifications of problem gambling itself vary, they have generally been used to describe problem gambling among adults, not adolescents.

Similarly, there is currently no single, agreed upon conceptual model of adolescent problem gambling. Some consider the disorder to be a specific form of general addictive behavior (General Theory of Addictions) or general adolescent risk-taking (Adolescent Risk Behaviour Model) with roots in abnormal biological, psychological, and/or personality structures. Others consider it to be a form of impulsive adolescent behavior with roots in normal, rather than abnormal, developmental processes (Model of Neurodevelopmental Change). Still others view adolescent problem gambling to be a heterogeneous disorder with a combination of normal and abnormal causes, both within the individual and within the environment in which he or she lives (Pathways Model). While none of these theoretical perspectives have thus far received unequivocal empirical support, they have nevertheless advanced our understanding of adolescent problem gambling from one where a single biological, psychological, and/or social factor influences the development of this disorder, to one where a combination of these factors, in addition to others, come into play.

In terms of correlates, the review of research findings on adolescent problem gambling suggests that the typical adolescent problem gambler is male, slightly older, and may be of ethnic minority. He is relatively high in excitability, impulsiveness, and extroversion, but low in self-discipline, self-esteem, and general coping skills. He likely engages in other risk-taking activities and problem behaviours, and may lead an emotionally unstable life characterized by anxiety, depression, stress, suicidality, and traumatic life events. He probably started gambling at an early age, engages in more formal types of gambling activities, experiences dissociative reactions while gambling, and gambles for non-financial reasons. He also likely has more accepting attitudes towards gambling and fails to completely understand the role of skill, probability, and randomness in determining gambling outcomes. His parents and friends are also more likely to gamble and/or have their own gambling problems.

Although many factors have been found to relate to adolescent problem gambling, research has thus far been unable to establish what exactly the nature of their relationship is to this disorder. Further studies, preferably those that are longitudinally-based, are needed. Also needed are studies to examine the role that factors already identified to play a role in *other* adolescent problem behaviours (e.g., family history of alcoholism, poverty, etc.) play in adolescent problem gambling.

3.2 SUBSTANCE USE AND ABUSE

Many investigators in the field of substance use and abuse have examined whether concepts and diagnostic criteria that have been used for adults can be applied to adolescents. The results of this research have been rather mixed. For instance, while Martin, Kaczynski, Maisto, Bukstein, and Moss (1995) found some utility for the construct of *dependence* among their sample of adolescents with alcohol problems, they found less utility for the constructs of *withdrawal* and *tolerance*. They also found that adolescents with DSM-IV alcohol abuse diagnoses had more heterogeneous patterns of symptomatology than did adults, suggesting that the extent to which DSM-IV criteria for adult alcohol abuse can be applied to adolescents is limited. Other research has examined whether using two constructs (i.e., *abuse* and *dependence*) to diagnose adolescent substance use disorders would be better than using one. Results of this research suggest that a

single, combined set of criteria based on empirically derived diagnostic categories and number of symptoms would have more utility (Fulkerson, Harrison, & Beebe, 1999; Harrison, Fulkerson, & Beebe, 1998).

Similar to problem gambling, a number of models have been advanced to explain the aetiology of substance abuse. Without going into detail, some examples include: *Behavioural Undercontrol* (Jacob et al., 2001), *Pharmacologic Vulnerability* (Jacob et al., 2001), *Negative Affect Regulation* (Jacob et al., 2001), *Social Inoculation* (Evans, 2003), *Theory of Reasoned Action* (Evans, 2003; Kuther, 2002), *Planned Behaviour* (Kuther, 2002), *Social Development Model* (Lonczak et al., 2001), and *Problem Behaviour Theory* (Donovan, Jessor, & Costa, 1999; Jessor & Jessor, 1977; Murray & Perry, 1985). The most commonly used model is Jessor and Jessor's (1977) Problem Behaviour Theory.

3.2.1 Correlates

As with problem gambling, a variety of factors have been found to be associated with adolescent substance use and abuse. These are each discussed below.

Individual Correlates

Genetics

Research suggests there may be a common genetic basis for adolescent substance use across substances (Hopfer, Crowley, & Hewitt, 2003). Genetic influences, for instance, may underlie the association between social deviance and alcohol-related problems (Mustanski, Viken, Kaprio, & Rose, 2003). Genetics, however, seems to interact in important ways with other variables, such as gender and environment: In a study of MZ and DZ twins, Silberg, Rutter, D'Onofrio, and Eaves (2003) found that genetic factors seemed to mediate girls' substance use whereas boys' use seemed to be mediated mainly by shared environmental factors reflecting family dysfunction and deviant peer association. For alcohol consumption specifically, it appears that for male adolescents at least, genetic influences on drinking are potentiated by exposure to parental drinking (Cleveland & Wiebe, 2003). These data support the findings of Derevensky and Gupta (1998b) who suggested that predisposing factors and pathways to a gambling problem might be different for adolescent males and females.

Biological maturity

Maturational changes in the adolescent's neurological system may also play a role in adolescent substance abuse. As we will discuss shortly, impulsivity and sensation seeking are each related to adolescent substance use, and research suggests that both of these personality characteristics may be at least partly due to maturational changes in the adolescent's frontal cortical and subcortical monoaminergic systems. As mentioned when reviewing the work of Chambers and Potenza (2003) in our section on problem gambling, these authors suggest these maturational processes may advantageously promote learning drives for adaptation to adult roles, but may also confer greater vulnerability to the addictive actions of drugs.

Impulsivity, sensation seeking, anti-social behaviour, and hyperactivity

Both sensation-seeking and impulsivity have consistently been found to be related to higher levels of adolescent substance use, including the use of marijuana, alcohol, and cigarettes (Baker & Yardley, 2002; Crawford, Pentz, Chou, Li, & Dwyer, 2003; Lewinsohn, Brown, Seeley, & Ramsey, 2000). Other personality traits found to be associated with substance use include antisocial behaviour and hyperactivity. Alcoholism, for example, has frequently been found to be related to both of these traits, although there does not appear to be an alcoholic personality *per se*, nor an addictive personality more generally (Rozin & Stoess, 1993).

Negative self-perception, low self-esteem, and other psychological characteristics

In addition to personality traits, negative self-perception and other psychological characteristics also seem to be related to adolescent substance use. Research on smoking, for instance, suggests that compared to non-smokers, adolescent smokers feel less in control of their lives and less able to monitor and adapt their communication to achieve positive outcomes (Booth-Butterfield, Anderson, & Booth-Butterfield, 2000). Adolescents with low levels of optimism, self-esteem, social assertiveness, and/or refusal-efficacy also appear more prone to substance use and/or its escalation (Carvajal, Wiatrek, Evans, Knee, & Nash, 2000; Li, Pentz, & Chou, 2002). Other research has shown that, depending on their intensity, many attributes that are valued in society—such as creativity, spontaneity, independence, tolerance of deviant behaviour, criticism of social institutions, being open to new ideas and experiences—are also associated with adolescent drug use (Murray & Perry, 1985).

Post-traumatic stress disorder, depression, attention deficit hyperactivity disorder, and conduct disorder

Several mental health problems have been linked to adolescent substance use and abuse, including post-traumatic stress disorder, depression, attention deficit hyperactivity disorder (ADHD), and conduct disorder (CD). Kilpatrick et al. (2000), for instance, found post-traumatic stress disorder to independently increase adolescent risk of marijuana and hard drug abuse, while Costello, Erkanli, Federman, and Angold (1999) found higher rates and earlier onset of substance use and abuse to be associated with depression. Goodman and Huang (2002) also found links between depression and substance use, whereby depressive symptoms moderated the relationship between substance use (e.g., cocaine and cigarette use) and socio-economic indicators (e.g., SES and education).

Molina and Pelham, Jr. (2003) reported from their longitudinal study that adolescents who as children suffered ADHD exhibited higher levels of alcohol, tobacco, and illicit drug use than did controls, and that the more severe the level of childhood inattention symptoms, the more substances that were used later on. Childhood CD symptoms have also been found to predict early onset of substance use and abuse in later adolescence (Armstrong & Costello, 2002), as well as adolescent CD symptoms (Molina & Pelham, Jr., 2003). Persistence of ADHD and CD in adolescence have each been found to relate to elevated substance use behaviours relative to controls (Molina & Pelham, Jr., 2003), findings consistent with Kuperman et al.'s (2001) research that found that ADHD and CD typically occurred before alcohol dependence.

Positive outcome expectancies

Adolescents' expectancies surrounding a particular substance have been shown to have enormous effects on their consumption use, and may be even more important than certain personality traits, such as social conformity, sensation seeking, and self-efficacy (Cohen & Fromme, 2002). For alcohol, such expectancies may be better predictors of quantity of alcohol consumed than of frequency or intoxication (Chen, Grube, & Madden, 1994).

Previous and early substance use

The *Gateway Theory* of substance use posits that “soft” substance use can lead to “harder” substance use later on (Hanna, Yi, Dufour, & Whitmore (2001), and a variety of studies have found some support for this model among adolescents. Adolescent cigarette smoking, for instance, has been found to predict cigarette, alcohol and other substance use (Chen et al., 2002; DuRant, Smith, Kreiter, & Krowchuk, 1999; Hanna, Yi, Dufour, & Whitmore, 2001), while adolescent use or misuse of alcohol has been found to predict subsequent alcohol misuse (Guo, Collins, Hill, & Hawkins, 2000; Lonczak et al., 2001; O'Neill, Parra, & Sher, 2001), other substance use, and several negative consequences (e.g., employment problems, criminal and violent behaviour) (Ellickson, Tucker, & Klein, 2003).

Similar to the gateway theory, the *Problem Behaviour Theory* that postulates tolerance of a substance can affect both its current and long-term use as well as subsequent problematic behaviour (Lo, 2000) has also received some empirical support among adolescents. In addition to some of the evidence presented above, studies have found, for instance, that heavy substance use among adolescents can cause immediate problems such as physical fights, accidents, and school absenteeism (Carlini-Marlatt, Gazal-Carvalho, Gouveia, & Souza, 2003), and that the younger individuals are when they start to indulge, the more frequently they are to engage in drinking and illegal drug use later on (Lo, 2000). Precocity of substance use has also been linked to later substance abuse (Kandel, 1980; Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000) and antisocial behaviour (Brounstein, Zweig, & Gardener, 1999). Other research has shown that weekly cannabis use can mark the threshold for increased risk of later dependence (Coffey, Carlin, Lynskey, Li, & Patton, 2003). Thus, the more severe and earlier the involvement in substance use, the greater the risk of future antisocial behaviour.

The above literature notwithstanding, it is important to note that use of a particular substance, even if begun at a young age, does not necessarily commit one to an enduring problem with that substance. Longitudinal research on alcohol consumption among adolescents in grade 7 through 12, for example, shows that there are a variety of discrete drinking patterns that may begin early, none of which necessarily leads to alcohol dependence (Colder, Campbell, Ruel, Richardson, & Flay, 2002).

History of stressful life events

Another factor that can increase the risk of substance use and abuse among adolescents is the experience of stressful life events. Such events, for instance, have been found to increase the likelihood of both regular drinking and smoking (Simantov, Schoen, & Klein, 2000), and to be

related to a significant "growth" in drug use—even after controlling for the effects of age and peer relations. This later relationship, however, may be moderated by high levels of attachment (Hoffmann, Cerbone, & Su, 2000).

Two kinds of stressful life events that may make the individual particularly vulnerable to later substance use and dependence are sexual and physical abuse, as a history of both these types of abuse have been found to relate to current substance use (Dembo et al., 2000; Neumark-Sztainer, Story, French, & Resnick, 1997), as well as substance abuse and dependence (Kilpatrick et al., 2000). In a study by Harrier, Lambert, and Ramos (2001), a combination of sexual abuse, physical abuse, ethnicity, and family violence differentiated substance abusers from non-abusers, while other research has shown that a history of sexual and physical abuse can accelerate the onset of alcohol disorders and primary major depressive disorder, which is itself a risk factor for alcohol abuse (Clark, De Bellis, Lynch, Cornelius, & Martin, 2003).

Social, Environmental, and Other Correlates

Parental substance use and abuse

Considerable evidence suggests a strong relationship exists between family substance use and abuse on the one hand and adolescent substance use and abuse on the other (e.g., Cleveland & Wiebe, 2003; Kilpatrick et al., 2000; Li et al., 2002). With respect to alcohol use specifically, research has consistently shown a relationship between levels of parental drinking and adolescent alcohol use (e.g., Cleveland & Wiebe, 2003), and some research has shown that adolescents with a family history of alcoholism are less likely to transition out of large-effect drinking than those without such a history (Jackson, Sher, Gotham, & Wood, 2001; Sher & Gotham, 1999). With respect to smoking, research has shown that in addition to inadequate parental monitoring and deviant peer association, smoking among parents predicts smoking among their adolescent children (Biglan, Duncan, Ary, & Smolkowski, 1995).

Research conducted longitudinally has found psychoactive substance use disorder among parents to be positively associated with adolescent drug abuse, although this association was found to be attenuated by strong family cohesion (Hoffmann & Cerbone, 2002). Family drug problems have also been found to be even stronger predictors of early adolescent substance use and abuse than childhood psychiatric disorders or gender (Costello et al., 1999). Other research has shown that among adolescents in treatment for substance use or conduct disorder, between 25 and 44 percent of the variance in marijuana use could be accounted for by factors transmitted by parents (Hopfer, Stallings, Hewitt, & Crowley, 2003).

While the above data show that excessive substance use by parents can increase the risk of substance use and abuse in their adolescent children, it is important to note that other parental behaviours can have a tempering effect. Non-substance using parents can have a buffering effect on peer influence that encourage substance use (Li et al., 2002), and parents who encourage and set clear limits, monitor their children's behaviours, act as good role models, and provide a loving and supportive environment can reduce the risk of adolescent substance abuse (Kodjo & Klein, 2002).

Permissive parental attitudes and norms

Besides actual substance use, parental attitudes toward substance use can also have an important effect on adolescent substance consumption. A study by Olsson et al. (2003), for example, found that among 9th grade Australian students, cannabis use was associated with permissive parental attitudes to drugs and delinquency. It should be pointed out, however, that while these data suggest that permissive parental attitudes towards substance use can have detrimental effects on adolescent substance use, the opposite of permissive parental attitudes—restrictive attitudes—does not necessarily act as a buffer against it. Research by Andersen et al. (2002), for instance, showed that while maternal antismoking attitudes exhibited when children were young predicted reduced smoking prevalence by adolescent children, this was only true when parental behaviour (i.e., not smoking) was consistent with these attitudes. Similarly, even with permissive parenting, there are factors that can moderate the relationship with substance use: In the study reported by Olsson et al. (2003) above, while adolescent cannabis use was associated with permissive parent attitudes to drugs and delinquency, this relationship was moderated by a close parent-child relationship.

Lack of close relationships with parents

As we saw above, adolescents with close relationships to their parents are less likely to engage in cannabis use. Close relationship does not mean identity fusion. Bray, Adams, Getz and McQueen (2003) noted, in a longitudinal study among adolescent from grade 7 to 9, that higher levels of intergenerational individuation (i.e., having a better sense of self-identity while maintaining the relationship) to be related to smaller increases in adolescent alcohol use. At the same time, they noted that higher levels of distancing from parents were related to larger increases in drinking. So, a complex blend of self-identity and attachment seems to prevent increases in drinking.

Inadequate parental monitoring and lack of restrictions

Though perhaps not as powerful as peer related variables (to be discussed shortly), good parenting practices such as setting clear limits and monitoring behaviour have been found to have a strong inhibitory effect on adolescent substance abuse (Dielman, Butchart, Shope, & Miller, 1990; Kodjo & Klein, 2002). Conversely, poor parenting practices such as inadequate parental monitoring have been found to be associated with greater adolescent substance use (Biglan et al., 1995), and may even be more important than such variables as family conflict, discussed below.

Living with non-intact families and family conflict

The type of family adolescents live in appears to have a profound impact on their substance use, particularly excessive use. Adolescent heavy drinking, for example, has been shown to be more common in all types of non-intact families, although living with a single mother may be associated with less heavy drinking than living with a single father or with neither biological parent (Bjarnason et al. 2003). Adolescents are also more likely to use and/or abuse substances if they live in families characterized by conflict (e.g., Friedman & Glassman, 2000; Lewinsohn et

al., 2000), although family conflict may have greater effects on females than males (Dakof, 2000).

It is interesting to note that the specific relationship between family conflict and adolescent substance use seems to be an indirect one. Research by Ary and colleagues, for instance, shows that families experiencing high levels of conflict are more likely to have low levels of parent-child involvement and high adolescent involvement with deviant peers. These family conditions were related to poor parental monitoring, which was in turn associated with high problematic substance use behaviours (Ary, Duncan, Biglan, et al., 1999; Ary, Duncan, Duncan, et al., 1999).

Peer substance use and abuse

Although family clearly plays an important role in adolescent substance use and abuse, studies suggest that peers are also extremely important. Andrews, Tildesley, Hops, and Li (2002), for instance, observed that peer use of substances predicted young adult cigarette use, binge drinking, and problem use one and two years later. Research by Hussong (2002) suggests that different types of peer relationships (i.e., best friendships, peer cliques, and social circles) can have different effects on adolescent substance use, and that the negative effects on substance use of peers who use substances can be reduced by simultaneous association with close friends who are less involved with substances. Other research has also shown that decreases in the proportion of friends who smoke can significantly predict smoking cessation (Chen, White, & Pandina, 2001).

Further support for the effect of peers on substance use comes from research conducted on ADHD reviewed earlier. Marshal, Molina, and Pelham, Jr. (2003) found that deviant peer affiliation mediated the relationship between ADHD and substance use, suggesting that children with ADHD are more likely than those without ADHD to become involved with deviant peers and, as a result, more likely to use substances. Furthermore, the relationship between deviant peer affiliation and substance use was stronger for adolescents with ADHD, indicating that once they are immersed in a deviant peer group, adolescents with ADHD are more vulnerable to the negative social influences of that group (Marshal et al., 2003).

Whether peers play a more important role in adolescent substance use than other factors such as family and school has been explored in numerous studies. By and large, the data show that all of these factors can be significant predictors of adolescent substance use when analyzed together (Abdelrahman, Rodriguez, Ryan, French, & Weinbaum, 1998; Biglan et al., 1995; Dielman et al., 1990; Gil, Vega and Turner, 2002). Other research suggests that the relative size of parental and peer influences on substance use varies with the age of the adolescent and the particular type of substance (Allen, Donohue, Griffin, Ryan, & Turner, 2003), while other research shows that the negative effect of deviant peer associations can be potentiated when combined with low parental involvement and monitoring (Ary, Duncan, Biglan, et al., 1999; Ary, Duncan, Duncan, et al., 1999). There is also evidence, however, that individual characteristics (e.g., fighting, hyperactivity, oppositional behaviours, and likeability) even more than friends' deviance, are pivotal in the development of substance abuse later on (Dobkin, Tremblay, Masse, & Vitaro, 1995).

Lack of bonding to school and academic problems

School factors can influence the risk of substance use (e.g., Gil et al., 2002), over and above peer and parental effects (Allison et al., 1999). A bonding to school in particular appears to be a great protective factor. For instance, of all the significant variables at ages 10, 14 and 16 that Guo, Hawkins, Hill, and Abbott (2001) found to lower the chances of alcohol abuse and dependence at age 21 (e.g., close parental monitoring, clearly defined family rules, appropriate parental rewards for good behaviours, high level of refusal skills, and strong belief in the moral order), strong bonding to school was found to be the most consistent. Perhaps it should not be surprising, then, that academic problems have also been found to relate to current and persistent adolescent substance use (Abdelrahman et al., 1998; Lewinsohn et al., 2000).

Other social and environmental sources of influence

A number of other factors related to social and environmental contexts have been shown to impact upon the substance consuming tendencies of adolescents, including having multiple models for drug use, significant others who tolerate or encourage drug consumption, availability of drugs (Murray & Perry, 1985), poverty, and media portrayal of drug consumption (Kodjo & Klein, 2002). Such factors may be particularly influential for adolescents living in non-intact families (Bjarnason et al., 2003), but may be less influential among those in tune with one's culture and belief system (Kodjo & Klein, 2002).

3.2.2 Summary

Many investigators have examined whether concepts and diagnostic criteria used for adult substance use can be applied to adolescents. Results of this research suggest that while certain constructs and criteria may have some utility, others do not.

The research findings on adolescent substance use suggest that the typical adolescent who uses and/or abuses substances is high in impulsivity, sensation seeking, and hyperactivity, but low in optimism, self-efficacy, and self-esteem. He likely values independence, is more receptive to new ideas and experiences, tolerates deviant behaviour, and is critical of social institutions. He may have a history of conduct and attention problems, anti-social behaviour, depression, and post-traumatic stress disorder, and likely has experienced a relatively high number of traumatic life events, particularly physical and sexual abuse. He probably began using substances early in life, may have previous experience with "softer" substances, and generally has positive expectancies regarding substance use. He may come from a broken home characterized by conflict and lack of social support, and may have parent(s) who use or abuse substances themselves, have positive attitudes towards substance use, and/or do not monitor or restrict his behaviour. Outside of the family, he likely has friends who use substances, he may not be closely connected to his school, and he may live in an impoverished environment where substances are readily available and portrayed in the media.

3.3 RISK-TAKING

The concept of risk refers to the potential for loss. A risk behaviour can be an action (e.g., driving after drinking) or an inaction (e.g., not using a condom during sex) that entails a chance of loss to the actor. When one engages in such behaviour, it is called *risk-taking* (Beyth-Marom & Fischhoff, 1997). There are four general types: *thrill-seeking behaviour*, *reckless behaviour*, *rebellious behaviour*, and *antisocial behaviour* (Gullone & Moore, 2000).

Risk can also reflect a broader concept that quantifies the level of dangerousness of certain conditions in facilitating or causing some kind of harm. Usually based on statistical patterns of a population, risk factors then indicate the noxious events or conditions that produce or affect longer-term deleterious effects on a population (Moore & Parsons, 2000).

Generally, the main health-risk behaviours of concern today are substance use, unsafe and unprotected sexual practices, unhealthy dietary consumption, and physical inactivity (Kann et al., 2000). In addition to these, young people also face delinquency, crime, violence, and school underachievement, which in turn can lead to failure and dropout (Lerner & Galambos, 1998).

While adolescent risk behaviour is typically referred to pejoratively, it should be mentioned that not all adolescent risk-taking is negative. Indeed, it is normal for adolescents to explore different behaviours in order to gain experience and evolve as human beings, and some risk-related characteristics, such as adventurousness, creativity, and the desire to accept new challenges, may be a positive and crucial part of normal adolescent development (Moore & Parsons, 2000). That being said, even if some adolescent risk-taking is normal and even understandable given the novelty, self-formation, and freedom that characterize this period (Lerner & Galambos, 1998), there is a difference between *experimental* risk-taking and *chronic* risk-taking, and no studies have shown positive effects of the latter (Moore & Parsons, 2000). Indeed, according to Lerner and Galambos (1998), “normal” adolescent risk-taking can lead to damaging effects on health and well-being long term if it is engaged in repeatedly as opposed to just experimented with. It can also be detrimental if it begins relatively early in life and the adolescent becomes immersed in a lifestyle involving serious problem behaviours with a set of close like-minded friends at the exclusion of a constructive, positive lifestyle (Lerner & Galambos, 1998)

3.3.1 Correlates

Similar to problem gambling and substance use, a multitude of factors have been found to relate to general adolescent risk-taking behaviour. These are each discussed below.

Individual Correlates

Earlier age of initiation

Research suggests that the earlier the initiation of risky behaviours, the greater one’s chance of engaging in that behaviour extensively, suffering negative consequences as a result (Lerner &

Galambos, 1998), and engaging in other health risk behaviours (DuRant et al., 1999). Initiating risk-taking activity at a relatively early age may even be more important to subsequent risk-taking behaviour than several socio-demographic factors, including absolute age, ethnicity, gender, and academic achievement (DuRant et al., 1999).

Older age

Generally, the older adolescents are, the more frequently they report engaging in risk-taking behaviour (Gullone & Moore, 2000). Arnett (1996), for example, reported that for every type of reckless behaviour he examined among high school and college students (i.e., unsafe driving, unprotected and promiscuous sex, substance use, vandalism, and theft), frequencies of reckless behaviour were as high or higher among the latter than among the former. Other research using data from the National Youth Survey conducted on adolescents (11-17 years) also suggests a relationship between age and risk behaviour (Duncan, Duncan, & Strycker, 2000).

Male gender

Male gender also appears to be related to health-risk activity, as males have demonstrated a greater tendency towards exhibiting health risk behaviours than females (DuRant et al., 1999; Gullone & Moore, 2000). Girls, however, appear to be more cognizant of risk behaviour than boys, as they rate items on the Adolescent Risk Questionnaire as more risky (Gullone & Moore, 2000).

Male hormones

One reason why male adolescents may be more likely to engage in risk taking activity than adolescent females is because of hormones. During the mid-teens, male adolescents' levels of testosterone (the sex hormone most clearly related to aggressiveness) are 20 times higher than they are prior to puberty, whereas in females, this increase is only fourfold (Susman et al., 1987).

Biological maturity

Biological maturation may also be related to adolescent risk-taking. For example, despite being more popular and having a more positive self-image (Steinberg & Morris, 2001), research has found that early maturing males are at greater risk for delinquency and engaging in antisocial behaviours (e.g., drug and alcohol use, truancy, precocious sexual activity) than are late-maturing males, a finding that some have suggested may be due to early maturing boys having more friendships with older peers (Silbereisen, Petersen, Albrecht, & Kracke, 1989). Similarly, while early-maturing girls are often more popular, they are also more likely to become involved in delinquent activities, use drugs and alcohol, have problems in school, and experience early sexual intercourse. It also has been found that early-maturing females spend more time with older adolescents, particularly older boys, and that these relations have a negative influence on their adjustment (Silbereisen et al., 1989). There is some suggestion, however, that early maturation may be associated with an increase in problem behaviour only among girls who have had a history of difficulties prior to adolescence (Steinberg & Morris, 2001).

Sensation seeking, aggressiveness, and other personality characteristics

The personality trait of sensation seeking has been found to relate to every type of reckless behaviour, including various types of risky automobile driving, unsafe and promiscuous sex, alcohol and drug use, vandalism, and theft (Arnett, 1996). Sensation seeking has also consistently been found to be higher among male than female adolescents (Arnett, 2002b), and among older adolescents than younger ones (Rolison & Scherman, 2002), findings consistent with the significant effects of gender and age on risk-taking presented above. Other personality characteristics found to relate to risk-taking include aggressiveness (Arnett, 1996), sociability (Zuckerman & Kuhlman, 2000), susceptibility to peer pressure, and tolerance of deviance (Shope, Raghunathan, & Patil, 2003).

Psychological immaturity

Early psychological and relational competence has an important effect on future risk-taking involvement. Adolescents with a competent developmental organization may cultivate an area of special skill or interest (e.g., sports, art, music, job, community volunteer work) and use this as a vehicle to gain self confidence and a sense of self-determination. If such adolescents do engage in risk-taking behaviour (e.g., drugs, delinquent pranks), they are generally likely to only experiment with it (Cicchetti & Rogosch, 2002). Adolescents with more compromised developmental organizations, on the other hand, are likely to engage in risk behaviours more wholeheartedly as a means to strive for psychological autonomy. As a result, they are less likely to develop a sense of self-efficacy and may also be in greater jeopardy of experiencing more negative consequences from their risky activities. This may in turn curtail later opportunities and possibly result in different types of psychopathology (e.g., drug addiction, severe anti-sociality, crime) (Cicchetti & Rogosch, 2002).

Positive expectancies, reduced risk perception and other related cognitions

Perceiving risky activities to have positive outcomes is associated with engaging in risky behaviour, while the reverse is true for perceiving risky behaviour to have negative outcomes. Moore and Gullone (1996), for instance, found that among a group of adolescents questioned about risky behaviours such as smoking, substance use, dangerous driving, and other risky activities, there was a consistent relationship between risk participation and outcome judgment, with perceived pleasantness and likelihood of positive outcomes, and unpleasantness of negative outcomes, strongly associated with risk behaviour.

Another factor to consider is the relative significance of perceived benefits compared to perceived consequences. In a study by Goldberg, Halpern-Felsher, and Millstein (2002), for example, perceptions of benefits of alcohol and tobacco among 5th, 7th, and 9th graders were found to be significantly related to drinking and smoking 6 months later, over and above perceptions of risks, age of the respondent, and experience level. Experience with alcohol alone, especially positive experience, was also related to perception and behaviour. Goldberg et al. (2002) suggest that among late adolescents, perceived benefits are better determinants of adolescent risk-taking than perceived harms. Other research, however, suggests that perceived risks affected risk-taking more significantly than perceived benefits, particularly with older

adolescents (Rolison & Scherman, 2002). Ultimately, it seems that perceptions of both cost and benefit are important determinants of risky behaviour participation.

It is important to note that perceptions of risk and benefit are not static, but can change over time in response to participation in the risky activities themselves. In their 3 year study of risk-taking behaviour in adolescents, for example, Gerrard, Gibbons, Benthin, and Hessling (1996) found that increases in risk behaviour were accompanied by increased perceptions of vulnerability and prevalence and by decreases in the influence of health and safety concerns. Furthermore, the changes in prevalence estimates and health and safety concerns predicted subsequent risk behaviour. Such data suggest that adolescents may well be aware of the risks associated with their behaviour, but may change the way they think about these risks in ways that enable their continued participation.

Perception of risk may also be related to what has been labelled “optimistic bias,” or the tendency to view the likelihood of negative events as higher for others than for oneself (Arnett, 2002a). Those who have such a bias are more likely to accept risk due to their perceived lower chance of the risk actually being realized for themselves.

Immaturity of moral reasoning

Another factor found to relate to adolescent risk-taking is immaturity of moral reasoning, although this relationship seems to be an indirect one. Kuther (2000), for instance, found that adolescents with pre-conventional moral reasoning were more likely to rate themselves as low in behavioural competence, which, in turn, was associated with engaging in risky behaviour.

History of traumatic events, particularly physical and/or sexual abuse

Several studies have demonstrated a relationship between adolescent risk-taking behaviour and the experience of stressful life events. History of family problems and physical or sexual abuse have been found, for instance, to relate to gun-carrying, suicidal thoughts and attempts, sexual intercourse, pregnancy, drug use, delinquency, and unhealthy weight loss (Anteghini, Fonseca, Ireland, & Blum, 2001; Dembo et al., 2000; Neumark-Sztainer et al., 1997). Regarding the relationship between sexual abuse and substance consumption, however, there is some evidence that the relationship may be stronger among younger, as opposed to older, adolescents (Neumark-Sztainer et al., 1997).

Social, Environmental, and Other Correlates

Family conflict, lack of connectedness, and maladapted attachment

Parent-adolescent relationships and family climate are extremely important to adolescent development; indeed, they can even influence the timing and course of puberty (Steinberg, 2001). Most agree that the best parent-adolescent relationship is one that allows the adolescent to have age-appropriate autonomy, but within the context of close and harmonious parent-adolescent ties (Hauser et al., 1984; Lerner & Galambos, 1998; Steinberg & Morris, 2001). Connectedness to family has been found to act as a buffer against adolescent risk-taking activity

(Anteghini et al., 2001; Neumark-Sztainer et al., 1997; Resnick et al., 1997), while adolescents not positively and affectively tied to their parents are more likely to engage in risk-taking behaviour (Lerner & Galambos, 1998).

There is also evidence to suggest that different types of maladapted attachment styles between mother and adolescent can lead to different emotional and behavioural sets in adolescents. Research by Allen et al. (2002), for instance, has found adolescent attachment security to predict relative increases in social skills from age 16 to 18, whereas an insecure-preoccupied attachment predicted increasing delinquency.

Adolescents from warm, supportive families are more socially competent and report more positive friendships (Steinberg & Morris, 2001). Those from families experiencing high levels of conflict, on the other hand, are more likely to engage in a variety of problem behaviours, a relationship which may be mediated by low levels of parent-child involvement, poor parental monitoring, and associations with deviant peers (Ary, Duncan, Duncan, et al., 1999).

Reduced parental monitoring and other poor parenting practices

As suggested above, a strong connection to family may confer its benefits on adolescent risk-taking by enabling closer parental monitoring of behaviour. If parents do not monitor their children, or do not supervise, guide, or communicate with them effectively, there is greater likelihood that health compromising behaviours will result. Research by DiClemente et al. (2001), for instance, has found that adolescents who perceived less parental monitoring were more likely to exhibit a number of risk-taking activities, including unsafe and promiscuous sex, drug use, alcohol use, and delinquency.

The most effective parenting style is believed to be “authoritative,” whereby the parent monitors and sets clear standards but also allows for autonomy and joint decision making. This approach is consistently related to adolescent adjustment, school performance, and psychosocial maturity (Steinberg, 2001), and some research has shown it can have important effects on the adolescent’s choice of peers, which, in turn, can have important effects on risk-taking behaviour (Brown, Mounts, Lamborn, & Steinberg, 1993).

Other family related variables found to have a relationship with adolescent risk-taking include time spent together, support (Duncan et al., 2000), and psychiatric disorder, although it is unclear whether the latter is due to environmental or biological factors (Flisher et al., 2000).

Negative peer influence

Peers can have an enormous influence on adolescent risk-taking (Steinberg & Morris, 2001). Research by Beal, Ausiello, and Perrin (2001), for instance, found peer influence to relate to substance use and sexual activity, and to be the only measure independently associated with abstinence from these activities. In fact, peer influence emerged as the most consistent social influence on health-risk behaviour in all analyses they conducted. Other research has also found peers to either increase the risk of adolescent risk-taking (e.g., Duncan et al., 2000; Shope et al.,

2003; Patterson, Dishion, & Yoerger, 2000; Prinstein, Boergers, & Spirito, 2001), or decrease it (e.g., Anteghini et al., 2001).

The influence of peers seems to be strongest during middle adolescence, as compared to early or late adolescence (Brown, 1990). It also seems to interact in important ways with gender. Studies of car crashes involving young drivers, for example, show that while the risk for a crash is higher when there are at least two passengers in the car and when one of the passengers is male, drivers are more likely to drive safely when at least one of the passengers in the car is female, regardless of the sex of the driver (Arnett, 2002a). Other variables that have been identified as pertinent for understanding peer influence are personality, socialization history, and perception of peers (Steinberg & Morris, 2001).

It is interesting to note that peers seem to influence each other more by processes related to admiration and respect rather than by coercion and violence (Steinberg & Morris, 2001).

Lack of community resources, cohesion, and connectedness

In addition to peers and family, the broader community may have important effects on adolescent risk-taking behaviour. A neighbourhood characterized by poverty or urban high-density living, for example, has been found to relate to increased likelihood of engaging in risky behaviour (Lerner & Galambos, 1998), while perceived cohesion of one's neighbourhood may reduce this likelihood (Anteghini et al., 2001; Resnick et al. 1997; Silk, Sessa, Sheffield-Morris, Steinberg, & Avenevoli, 2004).

An adolescent's relationship to school is also important. Najaka, Gottfredson, and Wilson (2001), for instance, found bonding to school played a more important role than academic performance or social competency skills in determining participation in problem behaviour. Moreover, they report positive changes in attachment and commitment to school resulting from preventive interventions were consistently accompanied by positive changes in problem behaviour, whereas prevention programs improving academic performance and social competency resulted in either moderate improvements or were inconclusive.

3.3.2 Summary

Risk-taking generally refers to actions or inactions that may cause some sort of loss to the actor. While some risk behaviours may be normal and even beneficial for adolescent development, others can have both immediate and long term negative consequences, especially if begun early in life, are chronically engaged in, and form part of an overall problem behaviour lifestyle shared with like-minded friends.

The typical adolescent risk taker may possess the following characteristics. He may be an older male who possibly reached physical maturity relatively early. He may be high in sensation seeking, aggressiveness, and sociability, low in moral reasoning and psychological maturity, and is possibly relatively tolerant of deviance and susceptible to peer pressure. He may also be an emotional person who has experienced a number of traumatic life events, particularly physical and sexual abuse. He probably began engaging in risk-taking activities at a relatively early age,

and likely perceives risk-taking to have more positive—and less negative—outcomes, especially for himself as compared to others. He may live in a non-cohesive family characterized by conflict and psychiatric disorder, and may have parents who have not provided him with adequate social support, quality time, monitoring, or restrictions. Outside of the family, he likely has deviant peers, lives in a densely populated urban area with limited resources, and is not closely connected to either his school or his community.

3.4 A FEW COMMENTS ABOUT GENERAL ADOLESCENT DEVELOPMENT

Before we end this chapter, we would like to first say a few words about general adolescent development that may help provide some context for the literature reviewed above. We will then move onto Chapter 4 and discuss adolescent problem gambling measurement.

Adolescence is characterized by a rather lengthy transition phase during which the individual is neither child nor adult (Cicchetti & Rogosch, 2002). In addition to pubertal changes and the emergence of reproductive capacity, adolescents face a variety of critical tasks including handling sexual maturity in a responsible manner, establishing a cohesive self-identity, forming close relationships with members of the same and opposite sex, transitioning to secondary schooling and academic achievement, learning to be more independent, and developing the capacity for economic viability (Burt, 2002; Masten & Coatsworth, 1998). It is the successful accomplishment of these tasks that allow adolescents to become productive and healthy adult members of society (Lerner & Galambos, 1998).

While adolescence is generally not a period of turmoil for most individuals (Burt, 2002), many face academic failure, criminal activity, unplanned pregnancy and parenting, lack of job preparedness, challenges to health, and feelings of despair and hopelessness. These factors may both be caused and perpetuated by a life of social and economic poverty that precludes the necessary motivation to pursue a life marked by societal respect, achievement, and opportunity (Lerner & Galambos, 1998). In this context, maladaptive behaviour on the part of the adolescent such as problem gambling, substance use, and other risk-taking activity may represent (1) an attempt to complete normal developmental tasks, (2) the consequence of perceiving these tasks cannot be completed successfully, or (3) ambivalence about becoming an adult (Burt, 2002).

ADOLESCENT PROBLEM GAMBLING MEASUREMENT

The primary aim of this review is to describe the instruments currently available and to provide information about the characteristics of each instrument including, development, content, intended purpose of the instrument, psychometric properties (reliability, validity, and classification accuracy), norms, administration methods, scoring instruction, and interpretation of scores.

The primary aim of evaluating any instrument is to determine whether it measures accurately the characteristics of interest (Allen & Yen, 1979). Therefore, the instrument is considered satisfactory if the scores are shown to reflect important features of gambling behavior. Instruments are evaluated on the adequacy of their psychometric properties, including reliability, validity, and classification accuracy. Reliability is often defined as consistency, repeatability, and stability (Nunnally, 1978). Reliability can be influenced by factors such as the number of items in the scale, number of subjects used in the evaluation, and the type of subjects utilized in the development and evaluation of the instrument. There are two types of reliability, temporal stability and internal consistency. Temporal stability is measured by test-retest procedures, that is, administering the test to the same individual at two points in time, typically within a few days or one week. It is assumed that the characteristics of interest have not changed over the time period. The measure of test-retest reliability is the correlation coefficient. This mathematical construct, usually shown as “ r ” expresses the extent of correspondence or magnitude of the relationship between two scores. It ranges from 0, no relationship, to 1, perfect correspondence between the two scores. In order to demonstrate satisfactory temporal stability, a test-retest correlation of $r = .70$ or higher needs to be obtained.

Reliability is also measured by looking at the internal consistency of the test items. Internal consistency, is the concept that a set of items are all measuring the same construct. One way of measuring internal consistency is by comparing the score on one half of items to the score on the other half of the items. This split-half reliability is measured in terms of the correlation coefficient r . Another approach of measuring internal consistency is to utilize statistical techniques that measure the homogeneity of the scale, commonly measured by Cronbach’s *alpha* (1951), a coefficient that ranges from 0 to 1. The higher the alpha, the greater the internal consistency of the scale.

Validity is defined as whether the instrument measures the construct it purports to measure (Allen & Yen, 1979). One type of validity is content validity, that is, do the scale items cover the various features of the construct being measured. Another type of validity is criterion-related validity. Criterion-related validity is commonly assessed by measuring correlations between the scale of interest and other scales that measure the same construct. In order to demonstrate

validity, a new scale should be highly correlated with existing scales of the same construct that have already demonstrated satisfactory psychometric properties. For example, a new scale to measure problem gambling may be correlated with the SOGS, an instrument with demonstrated satisfactory psychometric properties. Nunnally (1978) suggests that one should expect modest correlations, in the $r = .30$ to $r = .40$ range, when computing validity correlations. Another validity indicator is how well the instrument is able to discriminate between two target samples. For example, a new measure of problem gambling should obtain high scores when administered to a sample of gambling treatment clients and low scores when administered to a sample from the general population.

Another measure of an instrument's utility and performance is classification accuracy (Baldessarini, Finklestein, & Arana, 1983; Fleiss, 1981). That is, how well does the instrument identify those with, and without, the disorder. Classification accuracy is typically assessed with a number of coefficients, including sensitivity, specificity, false positive rate, false negative rate, positive predictive power, and negative predictive power. Sensitivity is the true positive rate, that is, the rate of positive test results among those with the disorder, and specificity is the true negative rate, that is, the rate of negative test results among those without the disorder. False positive rate is the percent of positive test results among those without the disorder and false negative rate is the percent of negative test results among those with the disorder. Positive predictive power is the rate of true-positive results among all positive test results. Negative predictive power is the rate of true-negative results among all negative test results.

Each instrument will be described in terms of its development, author(s), year of development, number of items, administration method and time, intended use, scoring instructions, interpretation of scores, psychometric properties, and its strengths and limitations. Instruments designed for adults are presented first and instruments designed for youth are presented next. Please see Table 4 for a description of each instrument.

4.1 THE INSTRUMENTS

4.1.1 SOGS-RA

Winters, Stinchfield, and Fulkerson (1990; 1993a) revised the SOGS for an adolescent sample. At the time (i.e., 1990), there was no well-researched instrument to identify adolescent problem gamblers. Jacobs (1989b) had used Gamblers Anonymous 20 questions in a youth study and Lesieur and Klein (1987) used DSM-III based questions for their youth survey, but neither study reported detailed psychometric information on either instrument. Therefore, Winters, Stinchfield and Fulkerson revised the most commonly used adult instrument of the day, the SOGS, for adolescents and it is called the SOGS-Revised Adolescents or SOGS-RA. The investigators revised the SOGS by using a past 12-months time frame, changing the wording of items and response options to better reflect adolescent gambling behavior and youth reading levels, eliminating two items that were viewed as having poor content validity for adolescents; and giving only one point for sources of borrowed money rather than nine points as is done with the SOGS. The SOGS-RA consists of 12 items and a copy of the SOGS-RA can be found in Winters et al. (1993a). Reliability and validity coefficients were computed on 460 males aged

15-18. The SOGS-RA internal consistency reliability was $\alpha=.80$. In terms of validity, the SOGS-RA was correlated with gambling activity ($r=.39$), gambling frequency ($r=.54$) and amount of money gambled in past year ($r=.42$) (Winters et al., 1993a). Since its development, the SOGS-RA has been used in a number of youth gambling surveys, including Ontario (Govoni, Rupcich, & Frisch, 1996), Louisiana (Westphal, Rush, Stevens, & Johnson, 2000), Manitoba (Wiebe, 1999; Wiebe, Cox, & Mehmehl, 2000), Atlantic provinces of Canada (Poulin, 2000), and Oregon (Carlson & Moore, 1998).

For measuring problem gambling among youth, the research community has tended to be more lenient with diagnostic criteria and cut scores than they are with adults. Two scoring procedures have been used with the SOGS-RA, however, neither system has received extensive psychometric and classification accuracy analyses. These two scoring systems that have come to be referred to as the SOGS-RA “broad” and “narrow” criteria (Winters et al., 1990, 1993b; Winters, Stinchfield, & Kim, 1995). The broad criteria is based on a combination of gambling frequency and SOGS-RA score. To be classified as a problem gambler under the broad criteria, the respondent has to gamble at least weekly and obtain a SOGS-RA score of two or more; or gamble daily, regardless of SOGS-RA score (Winters et al., 1993b). Under the SOGS-RA narrow criteria a cut score of four or more indicates a problem gambler, a score of 2-3 indicates an at-risk gambler, and a score of 0-1 is a no problem gambler (Winters et al., 1995).

Because these two sets of SOGS-RA scoring criteria have caused some confusion, it is important to address the problems associated with the broad criteria. The SOGS-RA broad criteria is problematic for a number of reasons. First, Winters and Stinchfield moved from the broad criteria in 1993 to the narrow criteria in 1995 because of dissatisfaction with the broad criteria; and re-analyzed the original 1990 Minnesota data using the narrow criteria. Second, the broad criteria are not exhaustive of all patterns of gambling problem severity. This is due to the fact that not all patterns were present in the original Winters et al., (1990; 1993b) data and to the fact that the response options for gambling frequency items were limited to daily, weekly, monthly, less than monthly, and not at all. Gambling more often than weekly and less often than daily is missing from the broad criteria, such as gambling between two and six days per week. Third, most recent studies that have used the SOGS-RA have used the narrow criteria and there appears to be a consensus among most users of the SOGS-RA that the narrow criteria are preferred over the broad criteria. Fourth, the broad criteria are probably “too broad”. The SOGS-RA broad criteria define problem gambling as daily gambling and this is a questionable criterion for problem gambling--it is not found in either the SOGS or DSM. For example, does buying one lottery ticket per day (i.e., daily gambling) indicate problem or pathological gambling? The broad criteria considers a score of 2 as problem gambling and given that it is fairly easy to endorse two SOGS-RA items, particularly the subjective items, this also seems to be too low a threshold for problem gambling. The narrow criteria cut-score of 4 is similar to the SOGS and DSM-IV cut-scores of five. Fifth, the SOGS was originally intended to correlate with diagnostic criteria for pathological gambling and this is how most SOGS users interpret a SOGS cut-score, whereas, the SOGS-RA broad criteria are not close to that level of problem severity. Sixth, although some convergent validity information was reported for the broad criteria in the original SOGS-RA study, it did not provide any classification accuracy information. Seventh, a minor additional point about the SOGS-RA broad criteria is that the category “no problem gambling” is misleading because it suggests that all cases in this category are gamblers when in fact this

category includes non-gamblers. For these reasons, it is recommended that the SOGS-RA narrow criteria be used rather than the broad criteria for identifying adolescent problem gamblers.

4.1.2 DSM-IV-J and DSM-IV-MR-J

Fisher (1992) developed a 9-item questionnaire to measure DSM-IV diagnostic criteria of PG in juveniles and it was the first adaptation of DSM-IV criteria for youth. The DSM-IV-J has been used in a number of studies around the world to measure problem gambling among youth, including Britain (Fisher, 1993, 1995, 1999; Wood & Griffith, 1998), Spain (Becona, 1997), and Canada (Derevensky & Gupta, 2000b; Gupta & Derevensky, 1998b). The DSM-IV-J has yes/no response options and it has recently been revised by using multiple response options and is now called the DSM-IV-MR-J (Fisher, 2000b). There is one item for each DSM-IV criteria and the items are adapted from the DSM-IV criteria to reflect the developmental stage of youth. Fisher simplified the language and omitted details that were less relevant for youth. Fisher excluded criterion 10, because “young problem gamblers tend to resolve desperate financial situations caused by gambling by illegal methods (incorporated in item 8)” (Fisher, 2000, p. 258). Eight of the nine items have four response options: (1) never; (2) once or twice; (3) sometimes; and (4) often. Each item is scored as one point, and Fisher (2000) has a scoring system for the set of response options for each item. The score range is from 0 to 9 and a score of 4 or more is classified as a problem gambler. A factor analysis indicated a uni-dimensional scale with satisfactory internal consistency reliability ($\alpha=.75$). In terms of validity, the DSM-IV-MR-J had significantly different mean scores between regular and non-regular gamblers and between problem and social gamblers. Respondents classified as problem gamblers by the DSM-IV-MR-J also tended to play more games regularly, spend more money, borrow to fund their gambling, and sell their possessions to fund their gambling, however, no correlation coefficients were provided. The readability of the DSM-IV-MR-J test questions were at grade level 4.8 using the Fleisch-Kincaid Grade Level Test.

There are at least four concerns about the DSM-IV-MR-J. First, item #3 does not appear to match or concur with the DSM-IV criterion it is intended to measure. The DSM-IV criterion is “Made repeated unsuccessful efforts to control, cut back, or stop gambling”; and the item to measure this criterion is “In the past year have you ever spent much more than you planned to on gambling?”. There is nothing in this item about attempting to control or stop gambling. This item appears to be more closely aligned to the earlier DSM-III-R criterion #2, “frequent gambling with larger amounts of money or over a longer period of time than intended.” Second, the exclusion of criterion 10 seems premature at this point. Granted, it is likely a small number of youth who will rely on others to pay their gambling debts, however, it is known that parents have paid the gambling debts of their children. Criterion 10 seems relevant for youth and until proven otherwise, it should not be excluded from an instrument intended to measure DSM-IV diagnostic criteria. Therefore, the DSM-IV-MR-J appears to measure eight of the ten DSM-IV criteria and lacks items to measure criteria 3 and 10. Third, multiple response options were included in the revision of the DSM-IV-J, but these multiple response options appear to be ignored when it comes to scoring. The scoring instructions continue to use a dichotomous scoring of 0 or 1 for each item. Fourth, there is a lack of evidence of validity and no estimates of classification accuracy. The developer states that there is evidence of validity (significant differences between groups), however, there is insufficient detail given to judge the value of this evidence. For

example, we do not know how the groups (problem gamblers versus social gamblers) were selected or identified or what criteria was used to classify them as problem gamblers versus social gamblers.

Table 4: Description of instruments

	DSM-IV-J and DSM-IV-MR-J (1992; 2000)	SOGS-RA (1990)
Content Areas	- DSM-IV diagnostic criteria	- signs and symptoms of problem gambling; negative consequences
Number of items	- 9	- 12
Administration Time and Method	- 5 - 10 minute paper and pencil questionnaire	- 10 minute paper and pencil questionnaire
Scoring instructions, score range, cut-scores, and interpretation of scores	- each item is one point - score range is 0-9 - score of 4 or more is classified as a problem gambler	- each item is one point - score range 0 - 12 - 0 -1 indicates no problem - 2 -3 indicates at risk gambling - 4+ indicates problem gambling
Psychometrics		
- Reliability	- $\alpha=.75$	- $\alpha=.80$.
- Validity	- significantly different mean scores between regular and non-regular gamblers and between problem and social gamblers. DSM-IV-MR-J problem gamblers also tended to play more games regularly, spend more money, borrow to fund their gambling, and sell their possessions to fund their gambling	- gambling activity ($r=.39$), gambling frequency ($r=.54$) and amount of money gambled in past year ($r=.42$)
Classification Accuracy Indices		
Sample characteristics, criterion, base rate, sensitivity, specificity, and hit rate	- NA	- NA

Note. NA means Not Available, not provided, or unknown.

4.2 THE LIMITATIONS

4.2.1 Variability of Scores and Classifications

As eluded to at the outset of this report, one problem with current adolescent problem gambling measures is that the variability in their criteria and cut-scores can lead to different adolescent problem gambling estimates (Stinchfield, 2000b). In a recent study comparing the SOGS-RA to the MAGS-7, for instance, Langhinrichsen-Rohling, Rohde, Seeley, and Rohling (2004) found that while the estimated prevalence of adolescent probable pathological gambling was 8.2% with the former, it was only 1.7% with the latter. In another comparative study (Derevensky & Gupta, 2000b), the rate of problem gambling was found to be 3.4% with the DSM-IV-J, 4.0% with the SOGS-RA, and 5.8% with Gamblers Anonymous 20 Questions. While one could argue that a discrepancy of 2.4% between the most and least conservative instruments in this study is not that significant, it must be kept in mind that the numbers themselves are quite small, and thus what may seem to be even minor discrepancies between them can actually be quite meaningful. In any event, as we observed with the work of Langhinrichsen-Rohling et al. (2004) above, larger discrepancies in problem gambling estimates across instruments have been observed.

4.2.2 Questions about the Readability and Temporal Stability of Items

Another issue raised with adolescent problem gambling measures is that adolescents may not always understand the content of their items. Ladouceur and colleagues (2000), for instance, conducted a series of studies with children and adolescents using the SOGS-RA and found that when the meaning of items was specifically explained to respondents, scores on the instrument decreased considerably (see Ladouceur (2002) for a review). As noted by Derevensky and Gupta (2004b), however, because the SOGS-RA used in this research was in French, results may have been due to problems with translation rather than to ambiguity of the items *per se*. In a more recent study, Ladouceur (2002) examined the effect of explaining the meaning of items contained in the DSM-IV-MR-J to respondents. In the first phase of the study, all participants filled out the DSM-IV-MR-J. In the second phase, half of the participants were told exactly what the items meant, while the remainder were given no such instructions. In the final phase, all participants filled out the DSM-IV-MR-J for a second time. Unexpectedly, not only did rates of problem gambling decline for *both* the experimental and control groups following the intervention in this study, it decreased *more* in the latter group than it did in the former (i.e., 30% versus 20%, respectively)! Although these data clearly do not support the view that estimates of adolescent problem gambling are high because respondents misunderstand the content of instrument items, they do suggest another problem with these instruments: item instability.

4.2.3 Questions about the Appropriateness of the DSM-IV Diagnostic Criteria

As discussed earlier, DSM criteria form the basis of several instruments that are used to measure rates of problem gambling among adolescents (e.g., the SOGS-RA, DSM-IV-J, and DSM-IV-MR-J). Recent evidence suggests, however, that these criteria may not in fact be entirely appropriate for this population. In a study conducted by Ladouceur and colleagues

(Ladouceur et al., in press), for instance, the researchers assessed possible differences in the classification of adolescent gamblers when using the SOGS-RA versus a DSM-IV based semi-structured clinical interview. A total of 631 adolescents aged 15 to 17 years participated in the study. In the first phase, all 631 participants completed the SOGS-RA, then, based on their scores, they were divided into one of three gambling groups: non-problem, at-risk, and problem. In the second phase, a sub-sample of participants from each of the three gambling groups was randomly selected to complete the DSM-IV interview. Results showed that of the 93 adolescents identified as problem gamblers on the SOGS-RA, only 7 met the criteria for pathological gambling according to the DSM-based interview—a decrease of 92.5% in the number of pathological gamblers identified! While one could argue that the SOGS-RA *overestimates* the prevalence of adolescent pathological gambling, it could also be argued that the DSM-IV criteria *underestimate* it. Either way, as concluded by the study’s authors, the scientific community needs to reconsider how adolescent problem gambling is conceptualized, defined, and measured.

4.2.4 Variability in Domains, Variables, and Items

When one looks closely at current adolescent problem measures, it becomes apparent that there is no general consensus on what domains, variables, or specific items should be contained within them. As noted by Derevensky and Gupta (2004b) in their review of problem gambling instruments for youth, while most measures include certain variables (i.e., loss of control, illegal acts, borrowing money, family and occupational/school problems), some include variables that others do not (e.g., financial loss). Whether or not a particular item gets included in an instrument seems to depend to some extent on how important that item is believed to be in adolescent problem gambling. According to Derevensky and Gupta, measures of adolescent problem gambling should include items that assess gambling *behaviour* (i.e., frequency, number, and types of games played; amount of money spent) as well as its negative psychological, social, and financial *consequences*. Others point to the importance of having items that reflect the *chronicity* of gambling (i.e., whether it is merely experimented with or not), and that are sensitive to the particular developmental issues of adolescents (Chambers & Potenza, 2003; Stinchfield, Govoni, & Frisch, in press).

4.2.5 Inattention to the Goals of Screening versus Diagnosing

As discussed above, the SOGS-RA, DSM-IV-J, and DSM-IV-MR-J are each based on DSM diagnostic criteria. In the development, evolution, and application of these measures from their original DSM roots, little attention has been given to whether their primary purpose is to *screen* for adolescent problem gambling or to *diagnose* it. While one could argue that the SOGS-RA was developed for screening and the DSM-IV-J and DSM-IV-MR-J were developed for diagnosing, the instruments have, by and large, been used interchangeably for both purposes. As a result, when used as a diagnostic tool, the SOGS-RA may lead to a high number of false positives, whereas the reverse may be true when the DSM-IV-J and DSM-IV-MR-J are used for screening. Indeed, a number of researchers have suggested that the SOGS-RA probably overestimates prevalence rates of adolescent problem gambling (Derevensky & Gupta, 2000a; Govoni, Rupcich, & Frisch, 1996; Ladouceur et al., 2000), whereas the DSM-IV-J probably provides more conservative estimates (Derevensky & Gupta, 2000b; Stinchfield et al., in press).

4.2.6 Lack of Theoretical, Clinical, and Empirical Rationale

Aside from giving inadequate attention to the goals of screening versus diagnosing, adolescent problem gambling measures have also been criticized for the rather superficial approach that was taken in adapting them from their original parent versions. Instead of challenging the theoretical underpinnings or structure of their parent instruments (i.e., their domains, variables, or items), the instrument's authors merely adjusted the wording of items to make them age appropriate, and revised the response scales and scoring criteria to reflect what they believed made most sense logically. The SOGS-RA became a pared down, 12-item version of the original SOGS that includes just one item related to borrowing instead of nine. The DSM-IV-J became an even shorter instrument with reworded versions of just nine of the ten original DSM-IV criteria. The DSM-IV-J-MR likewise includes just nine items, with one of the original DSM-IV-J items, *withdrawal and loss-of-control*, split into two, and another, *financial bailouts*, omitted. Moreover, the third DSM-IV-MR-J item, *In the past year have you ever spent much more than you planned to on gambling?*, does not appear to directly correspond to the DSM-IV criterion it is supposed to correspond with, *Made repeated unsuccessful efforts to control, cut back, or stop gambling*. As a result, when combined with the omission of *financial bailout*, the DSM-IV-MR-J seems to measure just eight of the ten original DSM-IV criteria.

4.2.7 Other

In addition to the above limitations with adolescent problem gambling measurement, there are a few others that we would like to at least briefly mention. These include the fact that most measures have been based on psychiatric clinical assessments (Ferris & Wynne, 1999), and items contained within these measures may not be equal in their classification significance, and thus may need to be weighted (Wiebe et al., 2000).

4.3 SUMMARY

A number of instruments have been used to estimate prevalence rates of adolescent problem gambling. By and large, these measures are based on criteria that have been used to diagnose pathological gambling among adults, with wording and content adapted to be more suitable for adolescent populations. On the positive side, these instruments generally have good internal consistency reliability, criterion validity, and construct validity. On the negative side, these instruments, along with adolescent problem gambling measurement in general, have a variety of limitations, some of which may account for the widely variable estimates of adolescent problem gambling currently reported in the literature. Specifically, these instruments may 1) yield somewhat arbitrary scores and problem gambling classifications; 2) contain items that are misunderstood by respondents, lack adequate test-retest reliability, and may not be equal in their classification significance; 3) be based on criteria that are not in fact appropriate for adolescents; 4) be used for purposes other than what they are intended for; 5) lack sufficient theoretical, clinical, or empirical rationale; 6) lack consistency in the constructs they assess; and 7) require further psychometric testing.

THE CONCEPTUAL FRAMEWORK

5.1 PURPOSE OF THE FRAMEWORK

In the social sciences, conceptual frameworks are often employed to help link theory, concepts, and variables that guide research and measurement of the phenomenon under investigation. Babbie (1989) provides useful definitions of these terms to show their interrelatedness: A *theory* is a systematic explanation for the observed facts and laws that relate to a particular aspect of life (e.g., juvenile delinquency). *Concepts* are the basic building blocks of theory, the abstract elements that represent classes of phenomena within the field of study (e.g., criminal behaviour). *Variables* are the empirical counterpart of concepts, the concrete elements that can be observed and measured (e.g., number of arrests). Because they can be observed and measured, variables require more specificity than do concepts.

Through the process of conceptualization, researchers are able to sort out the vague mental imagery of their theoretical concepts and specify exactly what they mean when they use particular terms. The resulting conceptual framework guides observation and measurement by grounding the research in theory, showing how concepts are derived from that theory, and specifying what variables are needed to represent those concepts. Within this context, the purpose of our conceptual framework is:

1. To ground the research into measuring adolescent problem gambling in theory,
2. To illustrate how concepts most relevant to identifying adolescent problem gamblers are derived from that theory, and
3. To specify the variables, and measurable indicators of these variables, that best represent these theoretical concepts.

5.2 IMPLICATIONS FOR THE FRAMEWORK

In previous chapters, we reviewed the scientific literature on adolescent problem gambling, substance use, and general risk-taking. We also discussed the main instruments used to measure adolescent problem gambling and reviewed some of their limitations, along with limitations of adolescent problem gambling measurement in general. In this section, we consider the implications of this work for our conceptual framework.

5.2.1 Problem Gambling

Conceptual Models

General Theory of Addictions

Jacobs' General Theory of Addictions posits that addictions, including problem gambling, result from a physiological resting state and a psychological problem that cause discomfort for the individual from which he or she tries to escape. Gupta and Derevensky (1998a) provided empirical support for Jacobs theory among their sample of high school students.

The implications of Jacobs' theoretical perspective and Derevensky and Gupta's empirical support of it are at least two-fold for the development of our conceptual framework. First, they suggest that at least three key concepts are involved in adolescent problem gambling: a *predisposition* to developing a gambling problem (physiological and psychological), the *motivation* to gamble excessively (self-medication), and an *optimal level of arousal* (achieved through excessive gambling). Second, they suggest that the aforementioned predisposition, motivation, and optimal arousal levels are different for males and females.

Adolescent Risk Behaviour Model

Noting that many of the risk factors associated with adolescent problem gambling are the same as those associated with other risk-taking behaviours, Dickson et al. (2002) put forward the Adolescent Risk Behaviour Model. The model holds that adolescent problem gambling is a specific form of general adolescent risk-taking behaviour with the same common underlying cause.

Dickson et al. (2002) contend that they have presented a general theoretical model for guiding the prevention of adolescent risky behaviour. This proposition, however, is debatable. While the adolescent risk behaviour model adapted from Jessor (1998) is a heuristic conceptualization of risk and protective factors relative to adolescent problem gambling, it is unclear how the model serves as a framework for the development of prevention programs and interventions. At best, the utility of the model for prevention is already implied. For instance, the effects of one of their proposed social environmental risk factors—replacement of friends with gambling associates—might be reversed through a preventive initiative aimed at replacing gambling associates with other types of friends. This example appears self-evident, and the model does not provide any direction for such a preventive initiative, beyond merely flagging the risky prospect of the adolescent hanging out with gambling associates.

Despite its shortcomings as a prevention model, the work of Dickson et al. (2002) nevertheless has important implications for the development of our conceptual framework. First, the model clearly places adolescent problem gambling within a constellation of other adolescent problems associated with risky behaviour. As such, it reminds us that adolescent problem gambling is not a discrete disorder to be studied in isolation, but rather is one of many adolescent behaviour problems that arguably has its origin in general risk-taking behaviour or lifestyles. Second, the model shows that there are many risk factors common to both adolescent problem

gambling and other problem behaviours, suggesting that screening instruments for adolescent problem gamblers may, in fact, be netting “pathological risk takers.” This distinction is very important for the present research, which is ultimately aimed at developing a screen that will identify adolescent problem gamblers from within the pool of chronic risk takers. Finally, a third contribution of Dickson et al. (2002) is the classification within their model of risk and protective factors that are: 1) associated specifically with problem gambling, 2) common to both problem gambling and other adolescent problem behaviours, and 3) have yet to be examined or confirmed as correlates of adolescent problem gambling. This classification not only suggests specific correlates which might be incorporated into measures of adolescent problem gambling (e.g., self-esteem), but also suggests that some of these factors may embody larger concepts that might ultimately shape entire new directions in the field of gambling research. The concept of poverty, for instance, might be especially germane to understanding the motivation to gamble—both for adults and adolescents—especially since this activity essentially revolves around the acquisition and loss of money.

Neurodevelopmental Change

Chambers and Potenza (2003) propose that adolescent problem gambling and other behaviours related to poor impulse control are due, in part, to normal neurodevelopmental changes that take place during adolescence. By viewing impulsivity as a potentially normal characteristic of adolescence, Chambers and Potenza’s model suggests that the commonly observed connection between impulsivity and problem gambling in adolescents may be more tentative than previously thought, and, as a result, reminds us that: (a) efforts to define and measure adolescent problem gambling must take stages of adolescent brain development into account, (b) examination of the relationship between impulsivity and adolescent problem gambling in particular must take stages of adolescent brain development into account, and (c) the concept of “abnormality” in terms of adolescent gambling behaviour must be interpreted with caution.

Pathways Model

According to Blaszczynski and Nower’s (2002) Pathways Model, problem gambling always begins with ecological factors, then, depending on the biological and personality traits of the person, advances along one of three pathways until a gambling problem emerges. Although the three pathways are discrete, they all have in common gambling availability and accessibility, classical and operant conditioning, and cognitive processes.

While Blaszczynski and Nower’s Pathways Model of adolescent problem gambling has yet to be empirically investigated, their work has nevertheless advanced the theory of why and how different types of gambling problems develop. Their model also has several important implications for the development of our conceptual framework. First, the model suggests that adolescent problem gamblers are not a homogeneous group, but rather may be classified into several distinct sub-types, each sub-type being determined by separate and specific pathways. In this vein, the model may have utility for developing a typology of adolescent problem gamblers, although this will need to be confirmed through future research. Second, the pathway specificity and mapping of Blaszczynski and Nower’s model, combined with the clear delineation of problem gambling typologies, offers a useful conceptual framework to guide research, including

research needed to confirm these very pathways and typologies themselves. It is possible that future research will not only confirm these pathways and typologies, but may reveal that other pathways and typologies also exist. Finally, Blaszczynski and Nower's work has provided a unified theory that combines empirically supported problem gambling correlates with key problem gambling concepts, such as biological vulnerability (e.g., toward impulsivity, arousal seeking, attention deficit, and anti-social behaviour), emotional vulnerability (e.g., toward depression, anxiety, escapism, and mood regulation), co-morbidity (e.g., with other addictive disorders and psychiatric conditions), among others.

Despite the virtues of Blaszczynski and Nower's work, it is not without its limitations. In a critique of the Pathways Model published in *The Wager*, for instance, Donato (2003) suggests that while the model may advance the *theory* of problem gambling treatment, its practicality as a clinical treatment *instrument* is unclear. More specifically, because the model's three problem gambling sub-types exhibit the same overt behavioural characteristics, it would require considerable research to develop the necessary tools for identifying each sub-type specifically. Further, by having each problem gambling sub-type result from the same general mechanisms (i.e., conditioning, habituation, chasing, etc.), it may provide an oversimplified view of the experiences and conditions involved in the development of problem gambling. Finally, the model may fail to adequately represent the wide range in magnitude and severity of gambling problems and symptoms across the three problem gambling sub-types. While these criticisms speak to Blaszczynski and Nower's Pathways Model in particular, they do raise some important points for us to consider in the development of our own conceptual framework and instrument for adolescent problem gambling.

Correlates

The following list of variables have been found to relate to adolescent problem gambling

Demographic Correlates

- Gender. Problem gambling is more common among male than female adolescents.
- Early first gambling experience. Adolescent problem gamblers are more likely to have gambled at an earlier age.
- Gambling preferences change. As adolescents age, their preferences for specific gambling activities change, with problem gamblers gravitating towards more "formal" activities such as lotteries, instant-win and EGM play.
- Ethnicity. Adolescents from ethnic minorities tend to exhibit more problematic gambling behaviour than youth from non-minority groups.

Social Context

- Parental gambling and problem gambling. Parental gambling in general influences adolescents' gambling involvements. Furthermore, adolescent problem gamblers are more likely to have a parent with a gambling problem.

- Peer gambling. Adolescents gamble with their peers; however, companionship varies by type of gambling activity, gender and age. Problem gamblers sometimes replace long-time friends with gambling associates.
- Traumatic life events. Adolescent problem gamblers report more frequent traumatic life events, including abuse, neglect and abandonment.

Gambling Attitudes and Beliefs

- Positive attitude. Adolescents, and in particular problem gamblers, tend to have a positive attitude towards gambling, believing it is a harmless activity, which is the young person's right to choose.
- Erroneous beliefs. Adolescents, and in particular problem gamblers, are more likely to misunderstand probability; believe in their skill to influence outcomes; and view gambling as a good way to make money.
- Motivation – Adolescents, and in particular problem gamblers, tend to gamble more for enjoyment, to socialize with friends, for the challenge and excitement, and to forget/escape problems than to win money.

Personality and Psychological Factors

- Excitable and extroverted. Adolescent problem gamblers are more excitable and extroverted, and more likely to get a visceral thrill from gambling.
- Impulsivity. Adolescent problem gamblers are more impulsive.
- Self-discipline. Adolescent problem gamblers experience more problems with self-discipline and have difficulty conforming to societal norms.
- Risk-taking. Adolescent problem gamblers are more likely to be greater risk-takers and engage in other risky behaviours such as alcohol and drug use.
- Dissociation. Adolescent problem gamblers frequently cite dissociative reactions to gambling.
- Stress and anxiety. Adolescent problem gamblers report higher levels of stress and anxiety.
- Depression and suicide ideation. Adolescent problem gamblers report higher levels of depression, suicide ideation, and suicide attempts.
- Self-esteem. Adolescent problem gamblers report lower levels of self-esteem.
- Coping skills – Adolescent problem gamblers report poor general coping skills.

Physiological Factors

- Resting states. Adolescent problem gamblers have heightened physiological resting states, notably increased heart rates.

The list of variables found to relate to adolescent problem gambling has significant implications, not only for our own conceptual framework and measure of adolescent problem gambling, but for conceptual models and measures of adolescent problem gambling in general. First, the correlates themselves offer important clues as to what variables are most relevant to

adolescent problem gambling, and, as a result, shed important light on what specific items might be included in instruments to measure the adolescent problem gambling construct. Second, although the list of variables found to relate to adolescent problem gambling may seem extensive, it must be kept in mind that there are undoubtedly other variables related to adolescent problem gambling not on the list—some of which are already known and some of which have yet to be identified (Dickson et al., 2002). Our understanding, for example, of the relationship between problem gambling and neurodevelopment, brain chemistry, and genetic markers is only just beginning, as is our understanding of the relationship between problem gambling and poverty, community, education, social opportunity, and other similar variables. As research in these and other areas progresses, new correlates of adolescent problem gambling will undoubtedly emerge and, as a result, any new conceptual frameworks and measure of adolescent problem gambling will need to have the flexibility to be able to incorporate these other correlates as their significance is brought to light.

Measurement

Our review of adolescent problem gambling measurement shows that there are clear limitations associated with the instruments used to identify adolescent problem gamblers, particularly with the widely used SOGS-RA, DSM-IV-J, and DSM-MR-J. Briefly, these limitations include issues regarding the variability of scores and classifications; readability and temporal stability of instrument items; appropriateness of the DSM criteria; variability in domains, variables, and items; inattention to the goals of screening versus diagnosing; lack of theoretical, clinical, and empirical rationale; insufficient psychometric testing with adolescent problem gamblers and non-psychiatric clinical samples; and potential non-weighting of items that should be weighted. These limitations have several important implications for our conceptual framework and measure of adolescent problem gambling.

First, in light of the evidence suggesting that adolescents may not always understand items contained within problem gambling measures, it will be important to ensure all of the items contained within our new instrument are well understood by respondents. It will also be important that we know exactly how adolescents define gambling and what activities they consider to be gambling, so that we can design our items to be of most relevance to them and ensure that no gambling activities they engage in are missed—including those state-sanctioned, legal gambling activities that are (supposed to be) available to adults in the community only.

Second, given evidence suggesting that some DSM-IV criteria for adult pathological gambling may not be the most appropriate for use among adolescent populations, it is essential that we be very selective in choosing which, if any, of these criteria we incorporate into our new adolescent problem gambling instrument.

Third, the observation that little effort has been made to distinguish between the goals of screening versus diagnosing adolescent problem gambling alerts us to the fact that we must be very clear about what the intention of our own new measure is—and that is to *screen* for problem gambling in adolescent populations, not diagnose it.

Fourth, given that many researchers believe that adolescent problem gambling measures should assess gambling behaviour and consequences, perhaps these are the main domain variables our new instrument should assess.

Fifth, in light of the fact that current instruments used to identify adolescent problem gambling have been criticized for not being based on sufficient theoretical, empirical, or clinical rationale, it is extremely important that we make certain that our new instrument is. With the extensive review of the literature we have already undertaken and the diverse range of insights we are taking into consideration from the four key informant groups described earlier, we believe we are well on our way to achieving this goal.

Finally, other criticisms of current adolescent problem gambling measures inform us that in the development of our new instrument, we should conduct psychometric testing that will (1) validate the new measure with a criterion group of known adolescent problem gamblers; (2) ensure that our items have good test-retest reliability; and (3) determine whether all items have equal classification significance; if we find that they do not, we should seriously consider weighting at least some of them.

5.2.2 Substance Use and Abuse

Several studies have examined whether concepts and diagnostic criteria used to describe adult substance use and abuse can also be applied to adolescents. This research suggests that while some constructs (e.g., dependence) may be applicable, other constructs may not (e.g., withdrawal and tolerance). The research also shows that, compared to adults, adolescents diagnosed with alcohol dependence according to DSM-IV criteria have more heterogeneous patterns of symptomatology, suggesting that adult DSM-IV criteria may have limited utility for adolescent populations.

Given the limited applicability of adult *substance use* (e.g., alcohol use) constructs and DSM-IV diagnostic criteria to adolescents, it is likely that adult *problem gambling* constructs and DSM-IV diagnostic criteria will have similar limited applicability to adolescents.

Correlates

The following variables have been found to relate to adolescent substance use and abuse:

- Genetic correlates. There is some evidence for a common genetic explanation for adolescent substance use across substances (Hopfer et al., 2003). This suggests that similar genetic research in adolescent problem gambling populations may be fruitful.
- Gender differences. Both genetic and environmental factors predispose adolescents to use substances. For girls, genetic factors are predominant; whereas, for boys, use is mediated primarily by shared environmental factors reflecting family dysfunction (e.g., parental drinking) and deviant peer association. This supports the findings of Gupta and Derevensky (1998a) who suggested that predisposing factors and pathways to a gambling problem might be different for adolescent males and females.

- Sensation seeking and impulsivity. Sensation seeking and impulsivity have been consistently related to higher levels of substance use (Baker & Yardley, 2002). This finding appears to be similar for adolescent problem gamblers; however, in view of Chambers and Potenza's (2003) model that attributes impulsivity largely to early stages of neurodevelopment, this finding may have limited utility for discriminating disordered adolescents.
- Parental/familial influences. There are a number of parental and familial influences that affect adolescent substance use and abuse, including the following: parental substance consumption; parental norms and attitudes; parental monitoring, attachment and support; and family climate and history. Dickson (2002) and Blaszczyński and Nower (2002) have identified the importance of parental and familial factors as correlates of adolescent problem gambling; however, this relationship has been largely unstudied.
- Peer influences. Peer influence is also extremely important in adolescent substance use and abuse; arguably, more so than familial influence (Allen et al., 2003). Kobus (2003) considered that theories of social learning, primary socialization, social identity and social networking may help to understand the mechanisms of this type of social influence on adolescent substance use and abuse. The same suggestion seems to have relevance for examining adolescent problem gambling; however, this research has yet to be done.
- Intrapersonal factors. Some intrapersonal factors in the areas of personality characteristics, psychopathology and expectancies have currency when examining adolescent substance use and abuse patterns, and these include:
 - Adolescent substance use may be related to self-perception (Booth-Butterfield et al., 2000).
 - Personality characteristics (e.g., antisocial behaviour and hyperactivity) have been related to adolescent substance use (Mulder, 2002); however, there is little support for the concept of an "addictive personality" (Rozin & Stoess, 1993).
 - Adolescent substance use and abuse have been linked to several psychopathological disorders including: posttraumatic stress disorder (Kilpatrick, 2000), depression, ADHD and conduct disorder (Costello et al., 1999).
 - Adolescent expectancies surrounding a substance can influence consumption patterns; notably, positive outcome expectancies are associated with increased substance use (Cohen & Fromme, 2002).

As with peer influence, the association of these and other related intrapersonal factors have been largely understudied in adolescent gambling populations.

- Substance use as risk itself. Substance use is, in itself, a risk factor for later abuse. The gateway theory posits that “soft” substance consumption can lead to “harder” consumption at a later time (Hanna et al., 2001). Similarly, the problem behaviour theory postulates that a tolerance for substance use may exert an impact on current and long-term substance consumption, as well as problematic behaviour (Lo, 2000). These theories and findings appear to have currency for adolescent problem gambling; that is, an early first gambling experience has been correlated with the later development of a problem for some. However, in problem gambling research, the relationship between early experiences with particular “soft” gambling formats (e.g., card games at home) as a gateway to “hard” gambling formats (e.g., EGMs) and ultimately a gambling problem has yet to be established.
- Environmental factors. A number of environmental factors have been shown to affect adolescent substance consumption patterns, and these include: stressful life events (Simantov et al., 2000); significant others who tolerate/encourage substance use (Murray & Perry, 1985); substance availability; poverty; media portrayal of drug consumption; (Kodjo & Klein, 2002); school factors (Gil et al., 2002); and parental monitoring (Guo et al., 2001). While some of these factors have also been associated with adolescent problem gambling, far more research is needed to explore their significance.

The wide variety of individual, social, and environmental factors found to relate to adolescent substance use suggests that many of these same factors, if they have not already, will be found to relate to adolescent problem gambling as well. Much more research, however, may be required to fully understand the role that these variables may play. In the meantime, some of what appear to be the more important of these variables should be given serious consideration in our conceptual framework and new measure of adolescent problem gambling.

5.2.3 General Risk-taking

While risk-taking is typically referred to pejoratively, not all risk behaviours are negative. Indeed, for adolescents, certain risk behaviours may be a positive and crucial part of normal development, and should not be surprising given the degree of novelty, self-formation, and freedom that characterizes this period. Given that many adolescents as a normal part of development may have a general propensity for risk-taking and/or experimentation, it is very likely that some adolescent problem gambling, as a manifestation of this propensity, may be experimental as well. The main implication of this prospect for our conceptual framework and measure of adolescent problem gambling is that it suggests we need to remain very cognizant of, and be able to distinguish between, two potentially different types of adolescent problem gambling: one that represents “normal” experimental behaviour and one that represents more “abnormal” chronic behaviour.

Correlates

The following list of variables have been found to relate to adolescent risk-taking behaviour:

Individual Factors

Early initiation. The earlier the initiation of risk-taking behaviours in adolescence, the more likely it is the youth will engage in the behaviour to a greater extent and, subsequently, suffer negative consequences (Lerner & Galambos, 1998).

Absolute age. Younger adolescents generally report risk-taking practices less frequently than older ones (Gullone & Moore, 2000).

Gender and biological maturation. Adolescent males have demonstrated a greater tendency towards exhibiting health risk behaviours (DuRant et al., 1999; Gullone & Moore, 2000). Biological maturation differences may account for some of the gender differences in adolescent risk-taking behaviour (Susman et al., 1987; Steinberg & Morris, 2001).

Personality traits. Sensation seeking has been associated with every type of risk-taking behaviour, including driving fast, promiscuity and unprotected sex, alcohol and drug abuse, vandalism and theft (Arnett, 1996). Moreover, sensation seeking is consistently higher among male vs. female and older vs. younger adolescents.

Psychological maturity. The early development of psychological and relational competencies has an important effect on future adaptation and probability of risk-taking (Cicchetti & Rogosch, 2002). Risk-taking behaviours for adolescents with increased levels of psychological maturity are more likely to remain at an experimental level; whereas, less mature adolescents are more likely to engage in the behaviour wholeheartedly, with the result often being more severe and prolonged negative consequences.

Risk and benefit perception. The adolescent's perception of benefit is positively correlated with higher probability of participation in a risk-taking behaviour, and negatively with the perception of unpleasantness or negative outcome (Arnett, 2002a; Gerrard et al., 1996; Goldberg et al., 2002; Moore & Gallone, 1996; Rolison & Scherman, 2002).

Maturity of moral reasoning. The maturity of moral reasoning may also affect the probability of adolescent engagement in risky activity (Kuther, 2000).

Traumatic events. Traumatic events in adolescence, notably sexual abuse, have been associated with a risk-taking disposition (Anteghini et al., 2001; Dembo et al., 2000; Neumark-Sztainer et al., 1997).

Family and Peer Factors

Familial context. The style of parenting can place an adolescent at risk for problem behaviours, including risk-taking (Lerner & Galambos, 1998). Furthermore, a strong connection to family may enable closer parental monitoring of behaviour, thus

undermining adolescent risk-taking behaviour (DiClemente et al., 2001). Family environment (e.g., family time together, support for the adolescent, absence of familial psychiatric disorders) is a significant factor in understanding adolescent risk-taking behaviour (Duncan et al., 2000; Flisher et al., 2000).

Peer influence. An adolescent's peer group can have a strong positive or negative influence on his or her risk-taking proclivities (Steinberg & Morris, 2001). The nature of adolescent influence on risk-taking appears to be by way of admiration and respect rather than coercion, intimidation and violence. Peer influence appears to be strongest in middle adolescence compared to early and late adolescence, and is gender-related (Brown, 1990).

Community Factors

Community context. A neighbourhood characterized by poverty or urban high-density living produces a higher chance of adolescent risk behaviour actualization (Lerner & Galambos, 1998).

Community cohesion. The connectedness or cohesion found within the broader community, especially in relation to the neighbourhood and schools, may play a role in influencing adolescent risk-taking behaviour (Anteghini et al., 2001; Resnick et al., 1997).

School relationship. An adolescent's relationship (bonding) to his/her school is also predictive of problem behaviour and risk-taking (Najaka et al., 2001).

Similar to adolescent substance use and abuse, the above variables found to relate to adolescent risk-taking suggests that if they have not already been found to hold a relationship to adolescent problem gambling, they may well be found to in future research. In the meantime, the more important of these should perhaps be taken into consideration in our conceptual framework and measure of adolescent problem gambling, as they may provide important insights into this nominal adolescent behaviour problem.

5.3 ABOUT THE FRAMEWORK ITSELF

Now that we have considered the implications of the scientific literature and adolescent problem gambling measurement limitations for our conceptual framework, the time has come to assemble the framework itself. To begin this task, we first present the nine key assumptions that provide the foundation for the framework. We then illustrate graphically the framework and its various components.

5.3.1 Fundamental Assumptions

Assumption #1

There may not be a distinct mental health disorder of the impulse control type that may be labelled “adolescent pathological gambling.” Rather, apparent disordered gambling in adolescents may be better explained as a manifestation of other disorders (e.g., impulse control) and/or the adolescent’s stage of neurodevelopment.

Assumption #2

Given that a distinct mental health disorder labelled adolescent pathological gambling may not exist, there seems to be little use for DSM-IV *adult* pathological gambling criteria to either screen for, or diagnose, this uncertain disorder among adolescents.

Assumption #3

The purpose of our measurement instrument is to *screen* adolescent populations for a *non-clinical* condition nominally labelled “problem gambling.” It is not to *diagnose* individual adolescents with a *clinical* gambling “pathology.” Indeed, given Assumptions #1 and #2 above, there is no expectation that a single diagnostic measure can ever be developed.

Assumption #4

There is a distinction between variables that *relate* to adolescent problem gambling and variables that *describe* adolescent problem gambling. The former—what we have termed *correlate* variables—shed light on potential causality, whereas the latter—what we have termed *domain* variables—illustrate what adolescent problem gambling actually looks like. While both types of variables will be included in our measurement instrument, only the domain variables will be scored. The correlate variables will be included for research purposes only, to enhance our understanding of potential causes of adolescent problem gambling.

Assumption #5

Given that the goal of our screening instrument is to measure adolescent problem gambling, two main domain variables are paramount for inclusion in the instrument. These are actual gambling behaviour and negative gambling consequences. They are each described in more detail below.

Gambling behaviour

Gambling behaviour refers to the characteristics of the behaviour itself. These include *types and number* of activities engaged, the amount of *money and time spent* gambling (i.e., per typical gambling session and/or per given time period), the *frequency* of gambling (i.e., per given time period), and the *length of time* gambled in total (i.e., since the individual began gambling).

Negative consequences

Negative consequences refer to the wide range of negative impacts that the *adolescent* may be experiencing as a result of his or her gambling (e.g., anxiety, poor grades, arguments with others, etc.), and/or the negative impacts that those *around the adolescent* may be experiencing as a result of his or her gambling (e.g., anger, stolen property, etc.).

Assumption #6

Including items that tap the domain variables of gambling behaviour and negative consequences in our instrument will result in a measure that places the adolescent along a *continuum of problem gambling severity*. The thresholds, cut-points, and classification accuracy of the specific problem gambling categories that exist along this continuum will be established through pilot and psychometric testing.

Assumption #7

While it would be impossible to include all correlate variables known to relate to adolescent problem gambling in our measurement instrument, it is nonetheless important to include at least some of them. These variables should be chosen for their ability to provide further insight into adolescent problem gambling as this could provide important clues for subsequent clinical diagnoses and treatment. In this context, three correlate variables seem most appropriate for inclusion in our instrument. These are general risk-taking behaviour, impulsivity, and self-development/maturity. They are each discussed below.

General risk-taking behaviour

Because gambling may be but one of many risky activities the adolescent engages in, the pre-eminent behavioural problem of the adolescent problem gambler may well be a propensity for general risk-taking rather than problem gambling *per se*. By including general risk-taking behaviour as a correlate variable in our instrument, it will help us to distinguish between these two possibilities.

Impulsivity

Adolescents generally tend to be impulsive, and this impulsivity may relate to their gambling behaviour. Determining whether some adolescents are more impulsive than others and the extent to which this greater impulsivity correlates with problem gambling may help us to determine whether an adolescent's presenting gambling problem might better be explained as a general impulse control disorder rather than a problem specific to their gambling behaviour.

Self-Development/Maturity

The concept of the individuated "self" also emerges in childhood and adolescence, mainly through the process of socialization. Agents of socialization include parents, other family members, peers, significant others, social institutions (e.g., school, church, media). The conceptualization and lexicon of the self includes: *self-identity*, *self-concept*, *self-image*, *self-consciousness*, *self-awareness*, *self-efficacy*, *self-esteem*, and *self-control* among others. Adolescents exhibit more or less advanced stages of self-development (commonly referred to as *maturation*), which in turn influences their behaviour. It is useful to include variables and items in our instrument to identify the adolescent's stage of self-development, in the event that the adolescent's nominal gambling problem might be better explained as an outcome of immaturity or an under-developed self.

Assumption #8

Adolescent males are generally more involved in gambling and problem gambling than adolescent females. They may even gamble for different reasons than their female counterparts. Nevertheless, given that the purpose of our screening instrument is descriptive (i.e., to *identify* males and females with a gambling problem) rather than explanatory (e.g., to determine *why* males versus females gamble), it seems most appropriate for our instrument to measure problem gambling in both genders.

Assumption #9

Adolescents with gambling problems may represent a heterogeneous group of problem gambler sub-types with different pathways and/or factors involved in their development. Our conceptualization and measure of adolescent problem gambling, however, is not predicated on any such typology, pathways, or factor structure, as this might constrain the focus of our conceptualization and measure. Rather, the approach taken is descriptive and inductive, which means that any typologies, explanatory pathways, or factor structures that characterize adolescent problem gambling will be revealed as a result of research conducted with our new instrument, rather than being built into the instrument itself.

5.3.2 Schematic Representation

Figure 1 is an attempt to illustrate graphically our conceptual framework and its various components, based on the discussion in this chapter and including the nine assumptions presented above. Following is a brief description of each of the main elements contained within the diagram, with some points already touched upon in the preceding section.

Adolescent Risk-Taking Behaviour

Adolescent risk-taking behaviour is a subset of general adolescent behaviour that may be part of normal adolescent development. Thus, while gambling is obviously the key activity of interest in our conceptual framework, the new screening instrument will also measure the extent to which the adolescent engages in other risky activities (e.g., unsafe driving, substance use, etc). By including adolescent risk-taking behaviour as a variable in our framework, it will help us to determine whether a nominal adolescent gambling problem might better be described as a manifestation of general risk-taking proclivity as opposed to its own, distinct problem with a separate etiology.

Influencing Factors

Many factors influence both adolescent behaviour in general and risk-taking behaviour in particular, including the wide range of individual, social, and environmental variables discussed throughout this report. The factors we believe to be most pertinent to our measure of adolescent problem gambling are the individual factors of *impulsivity*, and *self-development/maturity*. By incorporating these two variables into our framework, it will help us to evaluate whether a nominal adolescent gambling problem might better be described as a manifestation of one or more of these constructs rather than an etiologically distinct problem.

The inclusion of measures of general risk-taking proclivity, impulsivity, and self-development/maturity in our new instrument enables us to identify the broader intrapersonal factors associated with problem gambling. Determining whether an individual is an excessive risk-taker, exceptionally impulsive, or under-developed in terms of maturity will provide a rich context within which to interpret and understand adolescent problem gambling.

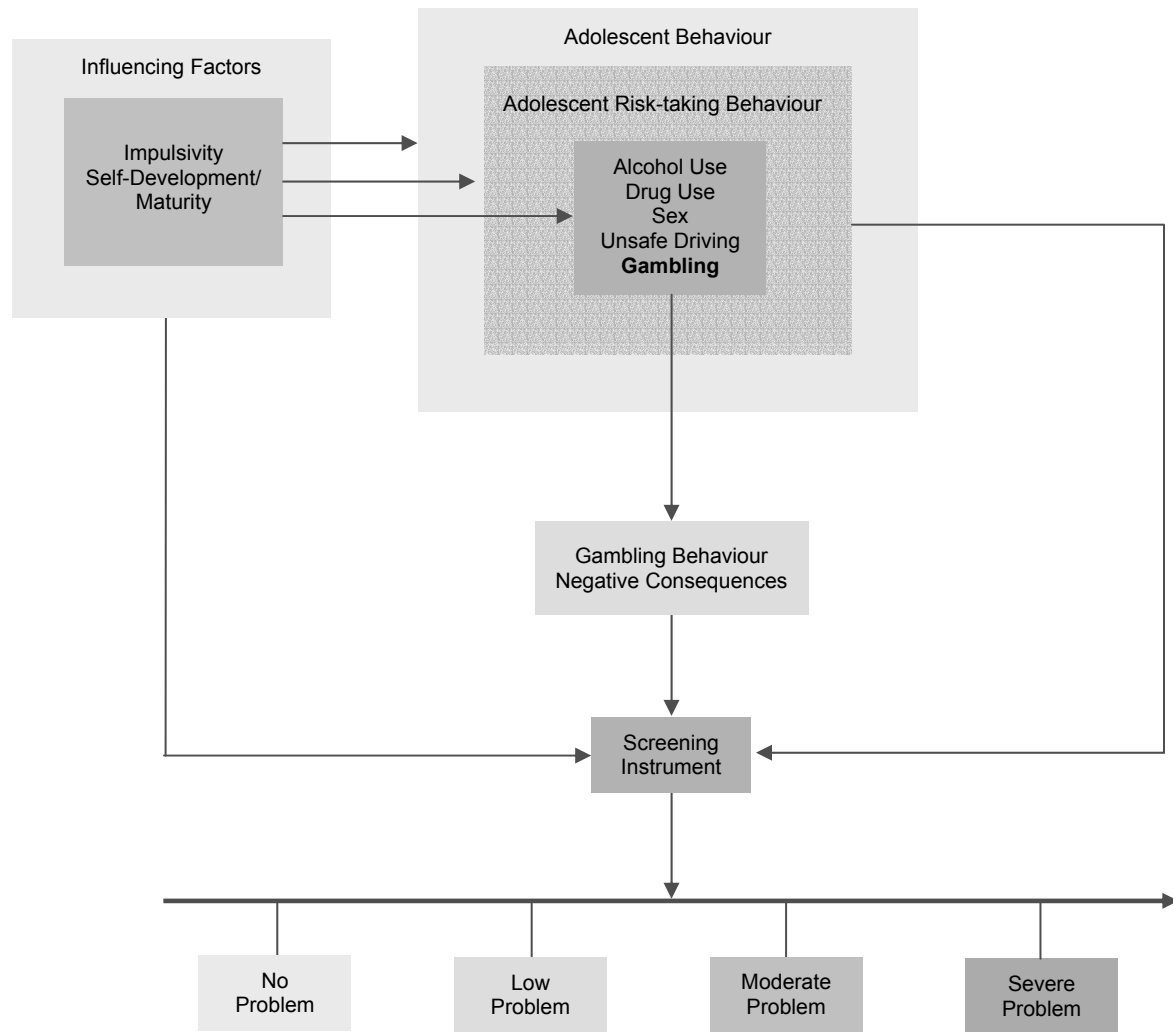
Gambling Behaviour and Negative Consequences

While the variables discussed above (i.e., adolescent risk-taking behaviour and influencing factors) will be included in our new measurement instrument, they will only serve as *correlate* variables. The *domain* variables that will actually be scored are: gambling behaviour (i.e., number and type of activities played; amount of money and time spent; frequency; and total length gambled), and negative gambling consequences (i.e., psychological, physical, social, occupational, etc.).

Continuum of Problem Gambling Severity

Based on scores on our new instrument, respondents will be situated along a continuum of problem gambling severity that includes *No Problem*, *Low Level Problem*, *Moderate Level Problem*, and *Severe Level Problem* classifications. Remember, by using the term “problem” here we do not purport to be diagnosing a clinical gambling *pathology*. Rather, we merely use the term in a non-clinical, socio-health sense to indicate that one’s gambling seems to be causing a problem, either for the individual, his or her family and friends, and/or the community at large.

Figure 1. *Diagram of the conceptual framework for defining and measuring adolescent problem gambling*



5.3.3 Operational Definition

There are many definitions of problem gambling cited in the literature and used in practice. Babbie (1989) differentiates “real, nominal and operational definitions,” (p.112) and concludes that operational definitions have the most utility in guiding inquiry, as they spell out precisely how a concept will be measured. Our conceptual framework leads to the following operational definition of adolescent problem gambling:

Adolescent problem gambling is persistent gambling behaviour that creates negative consequences for the gambler, others in his or her social network, or for the community.

This operational definition requires that the following two main elements central to our conceptual framework be measured to determine if an adolescent has a gambling problem: (1) gambling behaviour (i.e., type/number of activities played, money/time expenditure, frequency and duration of play); and (2) negative consequences (i.e., for the adolescent or for others).

As well as measuring these two main elements, the conceptual framework suggests that adolescent problem gambling might be better explained as manifestations of (1) an abnormally high level of general impulsivity; (2) an abnormally low level of self-development or maturity; and/or (3) an abnormally high level of risk-taking behaviour. One of the main challenges we face in measuring these three variables is to determine what “normal” levels of these behaviours are in adolescents. In developing the final instrument, an effort will be made to include sub-scales to measure impulsivity, self-development, and risk-taking so that any nominal gambling problem might be interpreted in this larger context.

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APPENDICES

APPENDIX A: KEYWORDS USED IN LITERATURE SEARCHES

Addiction

Addiction

Dependency

Behaviour

Behaviour

Conceptualization

Concept

Framework

Model

Models

Theories

Theory

Correlates

Consequences

Correlates

Determinants

Protective factors

Risk factors

Sex

Development

Cognitive

Socialization

Stages

Gambling

Gam*

Gambl*

Gambling

Measurement

Index

Instrument

Instrument development

[Name of specific instrument]

Reliability

Scale

Screening tools

Validity

Risk-Taking

Problem behaviours

Risk behaviour

Risk-taking

Risky behaviour

Sensation seeking

Substance

Alcohol

Cigarettes

Drugs

Smoking

Substance

Substance abuse

Substance misuse

Substance use

Youth

Adolesc*

Adolescent

Child

Child*

Children

Juven*

Student*

Teen

Teen*

Teenager

You*

Young adults

Youth

Note that because the search strategy varied somewhat between the two waves of literature searches conducted, some keywords used for assessing the same term may seem redundant (e.g., gam* and gambling). Keywords were searched in abstracts, keywords, descriptors and/or titles of the databases searched. In addition to the keywords, some authors were also searched.