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Toward testing a general theory of addictions: An examination of gambling, risk-taking, and related personality variables in adolescents

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August, 1997

A Thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements of the degree of Doctor of Philosophy in Educational Psychology

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Statement of Authorship

The three studies reported in this doctoral dissertation were co-authored by myself and Jeffrey L. Derevensky. For all three studies, Jeffrey L. Derevensky served in an advisory capacity during the formulation and conceptualization of the research questions, throughout the development of the experimental protocols, and while writing the final manuscripts. The results of the dissertation reported in Studies I, II and III have been submitted for publication in refereed journals and are presently under review. All three manuscripts were written and revised by myself. Portions of this dissertation have been presented at National and International Conferences. In addition, the Gambling Questionnaire used in the three studies was designed by myself with helpful suggestions from both Jeffrey Derevensky and Durand F. Jacobs. The data used in the three studies was collected by myself, with the help of two paid research assistants. The data analyses was performed by myself, although a statistical expert was consulted for the execution of the path analysis.

Statement of Original Contributions

This research constitutes an original contribution to knowledge in the area of addictions in general, and juvenile gambling in specific. The three studies reported in this dissertation examine the underlying etiology of gambling behavior in adolescents, and explore the concept of a predisposition for a gambling addiction. Few studies have examined possible predisposing factors for the development of gambling addiction, and no studies have done so with adolescents.

This thesis claims to make several specific original contributions. Study I is the first to evaluate several unique correlates of adolescent gambling behavior, such as motivation for gambling, familial and social influences, delinquent activities, cognitive perceptions of skill and luck, and suicidal ideation. Study II is the first to investigate personality characteristics associated with problem and pathological gambling among adolescents and extends our understanding of the relationship between gambling and risk-taking in adolescents. Finally, Study III examines the relationship between adolescent gambling behavior and depression, and is the first to investigate the validity of Jacobs' General Theory of Addictions, the most widely quoted theory in the gambling literature, with an adolescent population.

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Manuscripts and Authorship*

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Abstract

The three reported studies examine the possible etiology of gambling behavior and its correlates in adolescents with respect to motivational factors, predisposing factors as assessed by personality, depression and risk-taking traits, and by testing Jacobs' (1986) *General Theory of Addictions* which specifies a path toward the development of an addiction. Furthermore, the validity of the Arnett Inventory of Sensation Seeking (AISS) (Arnett, 1994) as a sensitive measure for assessing risk-taking in adolescent gamblers is assessed. Findings offer support for the premise of an *addictive personality* with problem and pathological gamblers differing from the norm on several personality dimensions including Excitability, Conformity, Self-Discipline, and Cheerfulness as assessed by the High School Personality Questionnaire. Furthermore, this group of adolescent problem gamblers was characterized by depression, high risk-taking, and tendencies toward dissociation. Support for Jacobs' *General Theory of Addictions* was ascertained, and the AISS was found to be a useful instrument for evaluating risk-taking among adolescents as it pertains to gambling behavior.

Résumé

Les trois études présentés examinent le development étiologique et les comportements associés avec le jeu pathologique chez les adolescents par rapport aux facteurs motivants, et les facteurs prédisposants, évalués par les traits de personalité, de dépression, et les tendences envers les sentiments fortes. Ceci a été accompli par l'entremise de l'évaluation de la *Théorie Generale des Addictions* de Jacobs (1986), qui spécifie un trajet vers le développment d'une addiction. De plus, la validité de l'inventaire de *sensation seeking* de Arnett (1994), comme une mesure très sensible à des variations de sensations fortes chez les adolescents qui participent aux jeux d'hazard, a été évaluée. Les résultats supportent la premisse d'une "personalité addictive" avec les joueurs problèmatique qui différent de la normalité sur plusieurs dimensions de la personalité, incluant les facteurs de l'éxcitabilité, conformité, discipline en soi, et jovalité, à partir de l'instrument "High School Personality Questionnaire". Les adolescents qui souffrent du jeu pathologique ont étés characterisés par la dépréssion, les sensations fortes, et les tendences envers la dissociation. Les résultats supportent la théorie de Jacobs, et l'utilité de l'inventaire de Arnett avec les adolescents.

Introduction

Gambling behavior amongst children and adolescents is widespread and is a growing and pressing problem in today's society. This generation of youth is the first to be growing up in times of legalized gambling. Be it through the media, parental modeling, peer interactions, or governmental endorsements, children and adolescents are continuously exposed to issues pertaining to gambling; and the rising prevalence rates of adolescent gambling involvement and adolescent problem gambling are reflective of these circumstances. This research program was designed to better understand the social, cognitive, and emotional correlates of adolescent gambling behavior, a necessary prerequisite for the development of effective clinical and educational programs.

Retrospective studies reveal that adult pathological gamblers believe their addiction to have started during their early adolescent or childhood years. Like all addictions, pathological gambling can result in devastating consequences, such as losing friends, family and jobs, poor academic performance, and engagement in criminal acts to finance their gambling. Preventing such habits from occurring, and to detect youth at high-risk for such an addiction, is a complex problem involving an examination of the etiological factors underlying this behavior, measurement issues, and an understanding of the social, emotional, personality, and behavioral characteristics associated with this problem.

This program of research aims at understanding the nature of juvenile gambling, including the reasons for participating in gambling, with whom and where they do so, the types of gambling preferred, and their concerns and cognitions revolving around this pastime, with the ultimate goal of establishing criteria for identifying high-risk individuals. It also aims to further investigate into the probable link between risk-taking, personality characteristics and gambling behavior. This research *primarily* focuses upon testing a General Theory of Addictions proposed by Jacobs (1986), a theory often quoted in the psychological literature which holds many implications for prevention and intervention, but

which has never been directly empirically tested with adolescents. Furthermore, the usefulness of the Arnett Inventory of Sensation Seeking in assessing degree of risk-taking tendencies among adolescent gamblers will be investigated. A combination of all this information will provide a better understanding of juvenile gamblers, permitting parents, clinicians and educators to develop and implement effective prevention and intervention programs.

Overall review of the literature

Gambling prevalence rates among children and adolescents are reported to be rising with a recent survey revealing that 70% of youth engage in some type of gambling activity, and of those, 53% gambling a minimum of once per week (Gupta & Derevensky, 1996). While occasional gambling should not necessarily be considered problematic, the probability of children and adolescents becoming pathological gamblers or engaging in other risk-taking and/or antisocial behaviors remains worrisome. Problematic gambling has been shown to result in increased delinquency and crime, the disruption of relationships, and decreased scholastic scores (Ladouceur & Mireault, 1988; Lesieur & Klein, 1987; Wynne, Smith, & Jacobs, 1996). The most frequent illegal means used to gain money for gambling reported by high school students was found to be selling drugs, working for a bookmaker, selling sports cards, and shoplifting (Ladouceur & Mireault, 1988; Lesieur & Klein, 1987). In both studies, 10% of high school students admitted to having performed illegal activities to support their gambling behavior. Given the paucity of research examining gambling behavior amongst adolescents, and the ever increasing availability of games attractive to youngsters, the present research is designed to examine the etiology of this behavior, its relationship to risk-taking, as well as concomitant behaviors and personality traits associated with adolescent gambling behavior. Context

Although gambling is primarily thought of as an adult behavior, more recent research has suggested that it remains a popular activity amongst both children and adolescents (Fisher, 1994; Gupta & Derevensky, 1996; Ladouceur & Dubé, 1994; Ladouceur, Dubé, & Bujold, 1994; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987; Shaffer & Hall, 1996, Stinchfield, Cassuto, Winters, & Latimer, 1997; Wynne, et al., 1996). Given that there are frequently few observable signs of gambling dependence among children (often referred to as the "silent addiction"), and the scarcity of research in the area, such problems in children and adolescents have gone relatively undetected by parents and educators compared to other addictions (e.g., substance abuse) (Arcuri, Lester, & Smith, 1985; Lesieur & Klein, 1967). Results from retrospective studies have indicated that adult problem gamblers report the onset of their pathological behaviors to have begun quite early, between the ages of 10-19 (Custer, 1982; Dell, Ruzicka, & Palisi, 1981). As well, 20-25% of the children of adult gamblers engage in similar behavior themselves and/or show multiple addictions (Kusyszyn, 1972; Lesieur & Klein, 1987; Lorenz & Shuttlesworth, 1983). Gambling behavior can itself be very rewarding since it often leads to monetary gains, physiological arousal, and social acceptance.

Lesieur and Klein (1987) established that 5.7% of adolescents display signs of pathological gambling. Most problematic gamblers were males with low grades, with one or both parents having a gambling problem, and who gambled whenever opportunities presented themselves. A study examining gambling trends in Francophone Canadian adolescents in the Quebec City region (Ladouceur & Mireault, 1988) revealed that the three most popular forms of gambling were the lottery, sports betting, and card games. Participation in sports related gambling events was reported by 45% of adolescents. Close to 6% admitted not being able to stop gambling despite a desire to do so, and 1.7%, classified themselves as being pathological gamblers with most of them reporting to be addicted to card playing. As well, 90% of these adolescents indicated that their parents knew they gambled and that only 6% were opposed to such activities. This is particularly disturbing given the widespread availability of gambling opportunities (e.g., video poker machines and lotteries) and that many of the new lottery games (e.g., sports betting) are appealing to children and adolescents.

Problematic gambling amongst youth is not restricted to North America. Concern over the use of fruit machines by teens in the U.K. is increasing since they are readily available to them in arcades and coffee shops, and are not considered illegal under the age of 18. In one study, 50 adolescent slot-machine users agreed to a personal interview and completed a questionnaire as they exited a British amusement arcade. Twenty-three percent of the 39 male participants were classified as pathological gamblers as measured by the DSM-III diagnostic criteria (Griffiths, 1990a). A larger study done in the U.K. looking at 1,332 teens aged from 12 to 15, revealed 40% played slot-machines in arcades at least once a week, and 16% played 4 times a week or more (Huxley & Carrol, 1992). Fisher (1992) reported similar results with 54% of adolescents classified as social gamblers and 5% exhibiting pathological gambling in the U.K.

Teenage gamblers clearly present a growing problem in today's society. It has been well established that the number of adolescents engaging in gambling activities is growing (Jacobs, 1989; in press; Ladouceur et al., 1994; Rupcich, Govoni, & Frisch, 1995; Volberg & Steadman, 1989). A recent survey of adolescent gambling conducted in Alberta, Canada, found that 67% of respondents gambled, with 8% meeting the criteria for pathological gambling, and an additional 15% were at-risk for the development of an addiction to gambling (Wynne et al., 1996). This identified rate of pathological gambling amongst adolescents is the highest to date, reconfirming the increasing numbers of young people afflicted with this problem. The problem gamblers in the Alberta study reported starting to gamble before the age of ten, and usually in the presence of family members. A study by Govoni, Rupcich, and Frisch (1996) established that 8.1% of adolescents who gamble are problem gamblers and another 9.4% are at-risk for developing gambling problems. Furthermore, 20% of the interviewed adolescents indicated feeling bad about their gambling activities and 22% reported experiencing difficulties controlling their gambling behavior. Shaffer and Hall (1996) recently performed a large meta-analysis of the existing prevalence studies of adolescent gambling. Using 95% confidence limits, they established an estimated prevalence range of 4.4% to 7.4% of adolescents with serious problem or pathological gambling, and estimated another 10 to 14% of adolescents at-risk. Engaging in addictive behaviors such as gambling is appealing because it can alleviate painful states, an effect that may be especially alluring during a turbulent time for young

people who may be struggling with issues of identity and have not yet developed healthy and adaptive coping skills. Stinchfield et al. (1997) suggest that gambling participation among adolescents may serve as a "rite of passage" into adulthood.

Parents often serve as role models for gambling. Retrospective studies conducted on adult compulsive gamblers reveal that 25-40% of their parents were problem gamblers (Custer, 1982; Jacobs, Marstone & Singer, 1985; Lesieur, Blume, & Zoppa, 1986). It may not be the specific modeling of parental gambling that necessarily results in similar behaviors in their children, but rather the parental examples of developing an addiction in order to cope with stressful situations. Children from households where parental gambling is of concern report feelings of insecurity and a need for acceptance (Lesieur & Rothschild, 1989). A recent study with elementary students indicated that children gamble mostly with relatives at the younger ages, and less than 10% were fearful of being caught gambling by the time they enter grade 7, suggesting that in general parents are not opposed to their children's gambling participation (Gupta & Derevensky, in press).

The development of gambling behavior is likely the result of many concomitant factors interacting with each other. While adult pathological gamblers reveal different personality profiles depending on the measurers used (Bellaire & Caspari, 1992; Graham & Lowenfeld, 1986; Greenberg, 1980; Levy & Feinberg, 1991; Peck, 1986), there appears to be support for a general theory of addictions (Jacobs, 1986) such that predisposed emotional and physiological characteristics interact with situation-specific factors in the development of a particular addiction. It is highly probable that the two are not mutually exclusive, with both personality traits and the predisposing factors contributing to the development of pathological gambling.

Gambling Defined

Pathological gambling, compulsive gambling, and problem gambling are three terms frequently used to describe excessive gambling behaviors. Using the DSM-IV

(APA, 1994), at least five of the following ten diagnostic criteria must be met in order to qualify as a pathological gambler:

- 1) is preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)
- 2) needs to gamble with increasing amounts of money in order to achieve the desired excitement
- 3) has repeated unsuccessful efforts to control, cut back, or stop gambling
- 4) is restless or irritable when attempting to cut down or stop gambling
- 5) gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)
- 6) after losing money gambling, often returns another day to get even ("chasing" one's losses)
- 7) lies to family members, therapist, or others to conceal the extent of involvement with gambling.
- 8) has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling
- has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling
- 10) relies on others to provide money to relieve a desperate financial situation caused by gambling.

The definition of problem gambling is not as clearly defined, and is often used when referring to individuals who do not quite meet the criteria for pathological gambling, but who are not in complete control of their gambling nonetheless. Pathological and problem gamblers are reported to have personality and coping problems (Bellaire & Wolfgang, 1992; Graham & Lowenfeld, 1986) and view gambling as a solution or escape (Jacobs, 1986; 1988; 1989). Pathological and compulsive gambling imply an addiction and are synonymous with each other. Problem gambling, however, denotes a preoccupation with gambling that is not as severe, frequent, or intense, but interferes with daily functioning. Problem gamblers are often referred to as *potential* pathological gamblers since they remain at-risk for developing an addiction (Rosenthal, 1989; Shaffer, 1997).

Pathological gambling has four primary characteristics: (a) progression, (b) an intolerance of losing, (c) a preoccupation with gambling, and (d) a disregard for consequences (Rosenthal, 1989). Progression refers to the notion of tolerance. The gambler is not able to quit while ahead and will often continue to play until all money is lost. The belief among problem and pathological gamblers is that they can never win enough and they will exceed the pre-designated time and money initially intended for gambling. It is common for a gambler to increase the amounts of money wagered, and/or the odds against him/her, in order to obtain a desired state of arousal. An intolerance of losing or chasing is best described as an inability to accept failure and the inevitable temptation to win back what was lost. Losing is not considered part of the game and they repeatedly return to gambling as soon as possible to win back lost money to alleviate the guilt of gambling. This develops into a pattern that entraps the gambler. With their primary motive being to win back money lost, they bet more frequently, more heavily, and with a sense of urgency that most often increases their total losses at a rapid pace, thus requiring them to return another time to "win it all back". As a result, their chasing leads to a never-ending downward spiral. The gambler's predominant thoughts focus upon gambling, thinking of past gambling experiences, how to obtain money for future gambling, and when and/or where the next gambling venture will take place. An individual with such a compulsion repeatedly lies to cover up the extent of the problem. Gambling becomes a method of dealing with emotional or financial hardships, showing little regard for consequences. They become so preoccupied with obtaining money for gambling that they frequently borrow under false pretenses, institute false insurance claims, commit illegal crimes which at times put their own lives at risk, and jeopardize intimate and familial relationships. They are infrequently at home and show little concern for family needs. Their lying behavior is often confronted at this time by family and friends who feel betrayed. The gamblers can not win enough money gambling to cover their debts, and their financial manipulations often intensify. At this point, compulsive gamblers are

perceived to no longer have control over their lives. Rather, everything revolves around this addiction, which in turn controls them.

Gender Differences

Despite some conflicting findings, there appears to be an overall consensus that gambling is more popular amongst males than females (Fisher, 1990; Govoni et al., 1996; Ide-Smith & Lea, 1988; Ladouceur et al., 1994; Rosenstein & Reutter, 1980; Stinchfield et al., 1997), with pathological gambling being at least twice as common among males (Lesieur & Klein, 1987; Sommers, 1988; Volberg & Steadman, 1988; 1989). Griffiths (1989) suggests that gambling is more popular among boys because it allows them to display their masculinity in a social environment by exhibiting courage and bravery. Gupta and Derevensky (1996) found that females who were active video game players showed gambling prevalence rates similar to those of males. Interestingly, that subset of females actually gambled more frequently than males who were not attracted to video games. Several studies have shown no gender differences in adolescents' slot-machine playing (Fisher, 1992; Huxley & Carrol, 1992), although males are reported to play at a higher frequency than females (Huxley & Carrol, 1992). It is plausible that slot-machines are more appealing to female adolescents than other forms of gambling, or that their participation in slot-machine playing is more socially acceptable than other gambling venues. Little risk-taking is involved in the playing of slot machines since they usually require small amounts of money to play. As well, Griffiths (1989), has suggested that slot machines may not be popular for males due to the perceived lack of skill required and perceived lower levels of risk-taking involved. Little is known about the characteristics which may differentiate or highlight commonalties between male and female adolescent gamblers.

A General Theory of Addictions

For the majority of individuals, gambling is an enjoyable, harmless diversion from everyday life and is engaged in from time to time for purposes of entertainment. In the

1990's, the gambling industry has tried to promote itself as part of the entertainment industry. Just as many people drink alcohol, take illicit drugs, or smoke cigarettes on an occasional basis without developing a dependency, the same applies to gambling. However, some individuals turn to such activities for reasons beyond that of entertainment. They report feeling compelled to indulge repeatedly, until they can no longer control how often they engage in these activities. For addicts, the compulsion to gamble, consume alcohol and drugs, smoke, or excessively engage in sex overrides their self-control. There exists many forms of addictive behaviors, and the contention is that they are similar in that they all fulfill a similar need; to escape conditions of stress and unhappiness. The overriding question remains, as to whether there exists characteristics which predispose an individual to addiction?

Although gambling behavior can be traced back for centuries, it is only recently that it is viewed as addictive. Levinson, Gerstein and Maloff (1983) conducted a series of meta-analyses in an attempt to uncover psychological, sociological, and biological commonalties amongst the different disorders of addiction. Although they were unable to confirm a general theoretical framework, they concluded that regularities were evident across addictions, and that further investigation into a general addictions theory was warranted. Heroin addicts and pathological gamblers were found to share similar personality characteristics (Blaszczynski, Buhrich, & McConaghy, 1985) while other investigations have reported multiple addictions amongst individuals, suggesting they all fulfill a similar need (Lesieur, Blume, & Zoppa, 1986). Furthermore, Jacobs, Marston, and Singer (1985) collected extensive comparable information from adult and adolescent pathological gamblers, alcoholics, and compulsive over-eaters, an effort which resulted in the initial development of a comprehensive general theory of addictions.

Jacobs (1986), in defining his General Theory of Addictions, postulates several basic premises. He contends that two sets of interdependent, predisposing factors must be present for an individual to be at-risk for developing and maintaining an addictive behavior,

one a unipolar physiological resting state that is chronically either excessively excited or depressed, and the other a psychological nature characterized by feelings of inferiority and feelings of rejection from family and significant others stemming from childhood. A physiological predisposition of either chronic hyper or hypo-arousal is aversive. It is thus logical that individuals suffering from either of these extreme physiological resting states would be motivated to seek activities or substances which would make them more comfortable. It is believed that a person with a hypotensive physiological arousal level would find relief in a stimulating and exciting activity such as gambling. Such an individual would likely have a greater propensity for risk-taking and sensation-seeking than the norm. In contrast, a person with a hypertensive arousal state would find more relief in alcohol or marijuana, two substances known for their depressant effects. In both examples, gambling and substances serve to regulate and "normalize" physiological resting states. Support for this theory was obtained by Martinez-Pina et al. (1991) whereby adult pathological gamblers reported feelings of inferiority and rejection in their childhood, reported experiencing dissociative states when engaged in gambling, and showed a higher prevalence of depression than controls.

Jacobs (1986), in his General Theory of Addictions, proposes that an addictive preoccupation, such as gambling, enables the individual to find escape from painful realities and further fosters the sense of being a highly successful and admired individual who, at the time of indulgence, feels invincible. Dissociative states are reported to be common to all forms of addiction and permit the individual to escape into denial and bliss from psychological distress. This "altered state of identity" is believed to be the common goal of all addictive patterns of behavior, is extremely rewarding, and is believed to play an instrumental role in the maintenance of the addiction. Jacobs views addictive behaviors as a form of self-treatment, considering they permit escape from, and momentarily correct, a chronic stress condition. This immediate gratification of both a psychological and physical

nature, whether it is obtained from gambling, drinking, or another addiction, is believed to perpetuate the addiction.

Still further, Jacobs (1986) postulates that a conducive environment is a necessary prerequisite, and must accompany the coexisting predisposing factors in the development of an addictive behavior pattern. As such, it is likely that the individual will happen upon an activity by chance (such as participating in gambling, overeating, or consuming drugs) that will serve to regulate their abnormal physiological resting state and simultaneously alleviate psychological distress. This "chance triggering event" must present the individual with enough intensity and novelty in order to motivate him/her to actively pursue a similar activity in the future.

In sum, not all people are at risk of developing an addictive pattern of behavior. Rather, Jacobs' theory outlines that only those individuals with chronically aroused or depressed physiological levels of arousal, who also suffer from feeling of rejection and inferiority are at greatest risk for the development of an addiction. Furthermore, Jacobs cautions that adolescence is a time of heightened vulnerability for the development of an addiction due to the numerous psychological stressors and physiological changes characteristic of this developmental period.

Gambling and Related Personality Constructs

Gambling is often referred to as a form of risk-taking or sensation seeking behavior. Sensation seeking is a global trait, and is conceptualized as "the need for varied, novel and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences" (Zuckerman, 1979). Individuals with higher sensation seeking needs exhibit greater drug and alcohol consumption, more frequently engage in gambling activities, and are more likely to engage in high-risk activities such as drinking while driving (Zuckerman, 1994). Kuley and Jacobs (1988) found, utilizing Zuckerman's Sensation Seeking Scale, that the total sensation seeking scores of problem adult gamblers were significantly greater than those of social gamblers and they scored significantly higher than social gamblers on the Disinhibition, Boredom Susceptibility, and Experience Seeking subscales. Similar findings were obtained by Dickerson, Hinchy, and Fabre (1987), and by Derevensky and Gupta (1996) with young adults. These findings lend partial support to Jacobs' General Theory of Addictions, using adults, with respect to his premise that problem and pathological gamblers suffer from abnormally depressed arousal levels, causing them to orient themselves toward activities which provide that missing excitement and stimulation. Considering the importance of being accepted and highly regarded by one's peers during adolescence, being known as a gambler (or risk-taker) leads to social recognition and subsequently to a higher status amongst friends (Fisher, 1991; 1993; Fisher & Bellringer, 1996; Griffiths, 1991; Smith & Abt, 1984).

The psychological literature on risk-taking suggests that males are greater risktakers as compared to females and that adolescents are greater risk-takers than adults (Arnett, 1994). It is therefore not surprising that adolescent males are more actively involved in gambling activities than females (Fisher, 1990; Ide-Smith & Lea, 1988; Ladouceur et al., 1994; Rosenstein & Reutter, 1980) and adolescents are gambling at higher rates, and are at a higher risk of problematic and pathological gambling disorders than adults (Govoni et al., 1996, Lesieur & Klein, 1987; Stinchfield et al., 1997).

One study found a weak but significant relationship between "off-track betting" and sensation seeking (Dickerson et al., 1987), but in general, researchers have not delineated the different types of gambling tasks as they pertain to risk-taking. Jacobs (personal communication) expressed his belief that those activities which involve the greatest amounts of perceived skill would be more conducive to risk-taking. This theory makes intuitive sense considering individuals would likely not take great risks with activities they feel they have little or no control over. Following this logic, one could hypothesize that regular blackjack players would exhibit greater risk-taking than slot machine players. The pathological adolescent gamblers in a recent study by Wynne et al. (1996) preferred card games, sports betting, and pool, all activities with some objective element of skill involved and very high *perceived* levels of skill. In contrast, games of pure chance such as raffles, lottery, scratch tickets, and bingo appealed more to female nonproblem gamblers. These findings suggest that perceived illusion of skill influences playing preference. It may be that players are inclined to take greater risks, and invest larger amounts of money and time, when they believe the outcome is skill-dependent.

Several studies have investigated the construct of "control" as it pertains to gambling playing behavior, and it appears as though pathological gamblers are more likely than social gamblers to experience illusions of control (Babad & Katz, 1991; Browne, 1989; Coreless & Dickerson, 1989; Langer, 1975). Examining a relationship between locus of control and leisure activities with college students, Zenker and Wolfgang (1982) found that students who scored higher on internal control on the Rotter Locus of Control scale preferred skill to chance activities, suggesting that personality constructs influence types of activities selected. School aged children who were high frequency video-game players endorsed a higher illusion of control for gambling activities and were more likely to be regular gamblers that those who were not avid video game players (Gupta & Derevensky, 1996). It seems that their ability to control the outcome of video games influenced their gambling behavior such that they believe they can transfer their skill and control from video game playing to random games of chance. Another study revealed that a trend was found toward high frequency gamblers exhibiting an external locus of control, although the results did not meet statistical significance (Derevensky, Gupta, & Emond, 1995).

The view that there is some underlying personality type at the root of addictive behavior first originated with personality trait theorists. Evidence from adults indicates that there may be a number of different personality profiles amongst pathological gamblers. For example, Bellaire and Wolfgang (1992), using male pathological gamblers, found three distinct personality subgroups: 48% were suffering from serious personality disorders, 29% were experiencing severe difficulty with interpersonal relationships, and 22% had severe psychiatric disorders such as schizophrenia and manic depressive illness. Graham and Lowenfeld (1986), using the Minnesota Multiphasic Personality Inventory (MMPI), established four types of profiles amongst 100 male pathological gamblers, these being personality disorders, paranoia, emotional instability, and alcoholism. Hraba, Mok, and Huff (1990) found impulsiveness to be predictors of problem gambling. Numerous examinations of the personality correlates of pathological gamblers have found links with Antisocial Personality Disorder (Bland, Newman, Orn, & Stebelsky, 1993; Chen, Wong, Lee, & Chan-Ho, 1993; Kroeber, 1992). Pathological gamblers are also higher in neuroticism and psychoticism scores (Roy, Custer, Lorenz, & Linnoila, 1989) and possess certain personality traits such as above average intelligence, high energy levels, and are attracted to highly stimulating situations (Peck, 1986), tolerate boredom poorly, and avoid completing tasks which they perceive as dull (Custer, 1980). It is therefore evident that a clear personality profile of pathological gamblers is not available, taking into consideration the diversity of findings.

It is unclear as to whether the personality traits identified preceded and thus contributed to pathological gambling, or are consequences of the gambling problem. The ideal research design to examine this question would be a prospective investigation. However, examining personality characteristics in young teenage gamblers would also provide meaningful insight into the 'chicken-egg' question since their gambling patterns are relatively new and are unlikely to have altered their personality profiles to a significant degree, keeping in mind that these traits are believed to remain relatively stable across time.

Although not empirically based, the psychodynamic understanding of addictions deserves mentioning since it shares many commonalties with the *psychological predisposition* in Jacobs' (1986) General Theory of Addictions. Psychodynamic theorists view addictions as a substitute for an unfulfilling bonding experience with one's mother during infancy (Brehm, Khantzian, & Dodes, 1993). Addiction indulgence allows individuals who have not bonded adequately with their mothers to feel optimally soothed.

Thus, individuals with an addiction are perceived as desperately dependent people, resulting from a deficit in the psychological structure and sense of self (Brehm et al., 1993). As a result of a faulty ego ideal formation, the self-esteem suffers, which manifests itself as an inability or failure to judge one's relationships, work or play, as sufficient or satisfactory". Addicts thus turn to their addictions to feel satisfied. Brehm et al. (1993) contend that the pharmacological role of drugs is quite minor in the understanding of the nature of addiction. Regardless of the addiction, the clear common underlying addictive mechanisms, such as poor ego formation, defensive formations, fragile self-esteem, with the dysfunctional mother-child relationship remains at the root of all deficits. Not unlike the premises underlying Jacobs' theory, psychodynamic theory also emphasizes that all addictions are engaged in to serve a common goal.

Depression and Gambling

The link between compulsive gambling and the occurrence of depression is well established. For example, 76% of adult inpatients hospitalized for pathological gambling were diagnosed as having major depressive disorder, 38% as having hypomanic disorder, 26% of patients met the criteria for both disorders, and 8% were diagnosed with manic depressive disorder (McCormick, Russo, Ramirez, & Taber, 1984). More recent studies have yielded similar results (Blaszczynski et al., 1990; 1991; Blaszczynski & McConaghy, 1989; Lesieur & Blume, 1990; McCormick, 1993; Ramirez, McCormick, & Lowy, 1988; Raviv, 1993; Torne & Konstanty, 1992). However, one must exert caution when delineating causal relationships linking compulsive gambling with depression. It may be that depression precipitates these individuals to a life of addiction, or that gambling itself has led these individuals into a depressive state due to substantial financial and social losses. From the point of view of Jacobs' (1986) General Theory of Addictions, depression is perceived as a precursor to an addiction. Depression is a manifestation of hypotonic arousal levels, and gambling is an activity which provides the lacking stimulation, bringing upon dissociative states that permit escape from emotional pain. In light of this theoretical framework, problem and pathological gambling may serve as antidepressants (Raviv, 1993), and thus be extremely reinforcing.

Other Areas of Addiction and Relevant Findings

Support for a general theory of addictions is available from research in other areas of addictive behavior, such as drug, alcohol, and tobacco studies. If the general theory is in fact valid, the findings from all areas of addiction research are pertinent to furthering the understanding of the development of a gambling addiction. The communality of individuals being multiply addicted suggests that all addictions share similar reinforcing properties (Griffin-Shelley, Sandler, & Lees, 1992; Lesieur, Blume, & Zoppa, 1986). Adolescent problem gamblers were recently reported as being more likely to be smokers, heavier drinkers, and to use illicit drugs (Wynne et al., 1996). The common occurrence of multiple addictions necessitates further inquiry into a possible common neurological pathway for addictive disorders and common personal characteristics which may typify an "addictive personality". Research has provided valuable information in identifying associated risk factors which contribute to the development of addictive behaviors, fostering a growing understanding that there exist predisposing characteristics which place individuals at heightened risk for addiction problems. For example, an examination of the relationship between drug dependence and personality traits among 140 adolescents concluded that an addictive personality preceded the addiction, rather than an addiction creating the addictive personality (Sharma, 1995).

Researchers have identified several risk characteristics associated with an addiction. Harrison and Luxenberg (1995) studied problem users of alcohol from grades 6, 9, and 12. They concluded that alcohol abusers were 15 times more likely to report low selfesteem, emotional distress, antisocial behavior, and suicide attempts. Other researchers found that drug use was associated with high impulsiveness, neuroticism, low self-esteem, anxiety, and depression in a sample of convicted male offenders aged 17 to 21 (Cookson, 1994). Among a sample of 7th and 8th graders, the onset of cigarette smoking has been

associated with alcohol use, risk-taking, and low self-esteem. Self-esteem scores were actually found to be the highest among the individuals who continued to abstain from tobacco use at one year follow-up, emphasizing the key role of self esteem (Simon, Sussman, & Dent, 1995). High rates of co-existing problems were evident in adolescents admitted to treatment for alcohol and drug problems, including psychological distress, learning difficulties, poor self-esteem, social alienation, antisocial behavior, and histories of abuse (Harrison & Hoffman, 1989). Self-esteem emerges as the single most consistent risk predictor for addiction in the research presented.

Findings also suggest that the age at which addictive behaviors begin is an important factor. Early initiation of alcohol use is believed to be a predictor of subsequent abuse and is usually accompanied by concomitant problems (Bailey, Flewelling, & Rachal, 1992). Harrison and Luxenberg (1995) found that the young problem alcohol users, aged 11 to 15, were more likely than their older peers to exhibit extremely elevated rates of risk factors and concomitant behavior problems. Although the senior high students (18 years old) had the highest rate of problem substance use, their relative risk-ratios were considerably lower than those of younger students. Their findings suggest that low selfesteem, emotional distress, and antisocial behavior are likely present amongst those who start engaging in addictive behaviors at a young age, placing them at heightened risk. There are clearly differences between individuals who start drinking at age 12 and those who do so at age 18 since substance use is considered much more deviant behavior for younger children. It is known that those who start gambling early are more likely to develop a gambling addiction (Custer, 1982; Dell, Ruzicka, & Palisi, 1981; Wynne et al., 1996). Pathological gamblers who began gambling at younger ages report greater suicidal preoccupation than those beginning gambling at older ages (Frank, Lester, & Wexler, 1991).

Principal Aims

This program of research examines the factors involved in the etiology of gambling behavior in adolescents, examine developmental and gender differences, examines the relationship between gambling behavior and risk-taking, identify personality variables associated with gambling behavior, and assesses the validity of Jacobs' (1986) General Theory of Addictions amongst adolescents. Furthermore, this research aims to evaluate the use of the Arnett Inventory of Sensation Seeking with adolescents who are active gamblers.

Considering the multiple goals established for this research project, the results are presented in the format of three separate studies. In Study I, prevalence and correlates of adolescent gambling behavior is presented. In Study II, personality characteristics and risk-taking traits as they pertain to non-gamblers, social gamblers, and problem and pathological gamblers are described. Finally, in Study III, the pertinent data presented in Studies I and II, along with additional data are presented in testing Jacobs' (1986) General Theory of Addictions. Although reported separately, the data presented in the three studies were collected from the same sample of Montreal high school students. Following the presentation of the three studies, an overarching discussion will serve to integrate the findings into a shared conceptual framework.

STUDY I

Adolescent gambling behavior: A prevalence study and examination of the correlates associated with excessive gambling

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Abstract

Eight-hundred and seventeen adolescent high school students in the Montreal region completed the DSM-IV-J gambling screen along with a questionnaire devised by the authors inquiring about their gambling behavior including items assessing the types of activities in which they engage, frequency of involvement, reasons for gambling, and their cognitive perceptions of gambling activities. The results indicate that, in general, 80.2% of students reported having gambled during the previous year, with 35.1% gambling a minimum of once per week. Adolescents reported participating in gambling behavior more often than any other addictive behavior such as cigarette smoking, alcohol consumption, and illicit drug use. The mean age of onset of gambling behavior for the sample was 11.5 vears, with the younger adolescents having started at earlier ages. The rate of pathological gambling was 4.7% as measured by the DSM-IV-J. Pathological gamblers were more likely to have parents with gambling problems, to be engaging in illegal activities, and to have more suicidal ideation than non-pathological gamblers. Gender differences were evident with males engaging in gambling activities more so than females. Differences in game preferences were found, with males more attracted to sports lottery tickets and sports pool betting and females more attracted to lottery tickets and bingo. Gambling awareness and prevention issues are addressed.
Review of the literature

Studies have confirmed that rates of pathological gambling are higher amongst the adolescent population than adults (Derevensky & Gupta, 1996; Lesieur & Klein, 1987; Jacobs, 1987; Shaffer & Hall, 1996; Stinchfield, Cassuto, Winters, & Latimer, 1997; Wynne, Smith, & Jacobs, 1996). Today's adolescents are the first to live their entire lives in a society of legalized gambling. As the gambling industry has permeated the entertainment industry at a rapid pace, the availability of gambling activities has reached an unprecedented level. No longer does one have to visit a casino or race track to place a bet. Gambling opportunities are at local corner stores, restaurants and bars. Lotteries, video lottery terminals (VL1's) and sports betting have become part of everyday life for many people. Although it remains illegal for minors to gamble on most government regulated activities, the willingness of gambling operators to turn a blind eye to juvenile gambling given the large revenues generated, results in children and adolescents being very much a part of the gambling industry.

Teenage gamblers present an evident problem in today's society. Severe gambling problems originate during the pre-teen and adolescent years or younger (e.g., Custer, 1982; Griffiths, 1990; Livingston, 1974; Wynne et al., 1996). Results generally suggest that 3.5% -8% of adolescents are pathological gamblers (Derevensky & Gupta, 1996; Fisher, 1992; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987; Shaffer & Hall, 1996; Winters & Stinchfield, 1993; Wynne et al., 1996), while 24-40% engage in some gambling behavior weekly (Huxley & Carrol, 1992; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987), and another 10% to 14% are at-risk for the development of severe gambling problems (Shaffer & Hall, 1996). Alarmingly, the percentage of youthful gamblers appears to be on the increase. A recent survey of adolescent gambling conducted in Alberta, Canada, found that 67% of respondents gambled, with 8% meeting the criteria for pathological gambling, and an additional 15% were at-risk for the development of an addiction to gambling (Wynne et al., 1996). This identified rate of pathological gambling amongst adolescents is the highest to date, possibly suggesting an increasing number of young people afflicted with this problem. The problem gamblers in the Alberta study reported starting to gamble before the age of ten, and usually in the presence of family members. However, not all studies show that the rates of gambling involvement amongst adolescents are rising. A large scale survey of high school students in Minnesota revealed no increase in gambling rates from 1992 to 1995 (Stinchfield et al., 1997), although older students in grade 12 gambled at slightly higher rates.

Engaging in addictive behaviors such as gambling is appealing because it is stimulating and can alleviate painful states, an effect that may be especially alluring during a turbulent time for children and adolescents who have not yet developed healthy, adaptive, coping skills. Of particular concern is the eventual suicide, by some individuals, to escape from painful realities once an addiction no longer fulfills the need. A national survey of 500 adult Gamblers Anonymous members revealed that 48% had contemplated suicide and 13% had attempted suicide, and that those with suicidal preoccupation began gambling earlier than non-suicidal gamblers (Frank, Lester, & Wexler, 1991). These findings suggest that when addictive behaviors are engaged in at young ages, little room is left for the development of more adaptive coping strategies. The eventual attempts at suicide are likely reflective of a lack of alternative, socially acceptable coping options.

Gender Differences in Gambling Behaviors

There appears to be an overall consensus that gambling is more popular amongst males than females (e.g., Fisher, 1990; Govoni, Rupcich, & Frisch, 1996; Griffiths, 1989; Ladouceur et al., 1994; Stinchfield et al., 1997; Wynne et al., 1996), with pathological gambling at least twice as common among males (Lesieur & Klein, 1987; Sommers, 1988; Volberg & Steadman, 1988; 1989). Gupta and Derevensky (1996) found that females who were active video game players showed gambling prevalence rates similar to those of males. Interestingly, that subset of females actually gambled more frequently than males who were not attracted to video games. This finding suggests that some females may be

more attracted, or predisposed, to certain gambling-type activities, although it remains unclear as to what distinguishes this group from others. Several studies have reported no gender differences in adolescents' slot-machine playing (Fisher, 1992; Huxley & Carrol, 1992) and among adolescents on lotteries, machines and horse and dog racing (Winters, Stinchfield, & Fulkerson, 1993), although males are reported to play at a higher frequency than females (Huxley & Carrol, 1992). It is plausible that slot-machines, or VLT's are more appealing to female adolescents than other forms of gambling, or that their participation in slot-machine playing is more socially acceptable than other types of gambling activities. Little risk-taking is involved in the playing of slot machines since they often require smaller amounts of money to play. In accordance with Griffiths (1989), it is also possible that slot machines are more popular amongst females due to the lack of perceived skill required and lower levels of risk-taking involved. Such findings indicate that the gender gap may be shrinking with increased availability and variety of gambling venues.

Perception of Skill and Luck in Gambling Behavior

Some individuals are realistic as to the role of luck and skill in any particular gambling venue, whereas others tend to be unrealistic, believing there is a greater element of perceived skill when in reality they remain games of chance based upon random outcomes (e.g., some believe that they can exert skill while playing slots) (Gupta & Derevensky, 1996). It remains unclear whether the player's perception as to the amount of skill he/she can exert in the game influences their playing behavior. The pathological adolescent gamblers in Wynne et al.'s (1996) study preferred card games, sports betting, and playing pool, all of these being activities with varying degrees of objective skill involved and very high perceived levels of skill. Games of pure luck such as raffles, lottery, scratch tickets, and bingo appealed more to the non-problem gamblers, especially females.

Several studies have investigated the construct of "control" amongst gamblers' playing behaviors, and it appears pathological gamblers are more likely than social gamblers to experience illusions of control (Babad & Katz, 1991; Browne, 1989; Coreless & Dickerson, 1989; Langer, 1975; Zenker & Wolfgang, 1982).

Parental Influences

Parents often serve as role models for gambling, with the literature clearly establishing parental gambling to be a good predictor of adolescent gambling (Arcuri, Lester, & Smith, 1985; Jacobs, 1989; Lesieur & Rothschild, 1989). Retrospective studies conducted on adult compulsive gamblers reveal that 25-40% of their parents were problem gamblers (Custer, 1982; Jacobs, Marstone & Singer, 1985). Among a sample of alcohol and drug abuse patients, 39% of those having fathers with a pathological gambling problem were pathological gamblers themselves, while an additional 23% were abusive gamblers. Heavy gambling by one's mother was also significantly correlated with pathological gambling (Lesieur, Blume, & Zoppa, 1986). It may not necessarily be the specific modeling of parental gambling that results in similar behaviors in their children, but rather the parental examples of having an addiction in order to cope with stressful situations. Children from households where parental gambling is a problem report feelings of insecurity and a need for acceptance (Lesieur & Rothschild, 1989). Still further, recent research finds that parents are willing role models to their children's gambling (Gupta & Derevensky, 1996).

Many issues concerning adolescent gambling problems remain unresolved. The purpose of this study is to examine adolescent gambling behavior from several perspectives: 1) to investigate the preferred types of gambling activities, 2) to identify the familial and social influential factors associated with juvenile gambling, 3) to evaluate adolescents' cognitive perceptions of the roles *skill* and *luck* as they pertain to gambling, 4) to identify the underlying motivational factors which result in gambling participation, 5) to assess the occurrence of comorbidity of other addictive behaviors, and 6) the determine the

degree to which problematic gambling involvement is associated with suicidal ideations and behaviors in adolescents. The adolescent population used in the current research spans a wide age spectrum, thus lending itself to providing useful developmental information on the above issues. Considering very little is known about the correlates of problematic gambling amongst adolescents, the information obtained will help to provide researchers and clinicians with a more complete, and hopefully more meaningful, understanding of the problem of juvenile gambling.

The present study is part of a larger program of research. The methodology and results presented are limited to the purpose of the present paper. Results extending beyond the scope of this paper are presented in Study II and Study III.

Methodology

Participants

Participants included 817 adolescents (417 males and 400 females) from grades 7, 9, and 11, with an age range spanning from 12 years to 17 years. Approval was obtained from three school boards, and five high schools within these boards volunteered to participate. The schools sampled were from middle class communities in the Greater Montreal region, and the adolescents were predominantly Caucasian. The breakdown of the sample with respect to grade and gender is outlined in Table 1.

TABLE 1

Grade	Males	Females	Total
7	117	141	258
9	190	146	336
11	110	113	223

Sample distribution by gender and grade

Instruments

DSM IV-J (Fisher, 1992) (Appendix A): This 12 item instrument is a screen for pathological gambling during adolescence, modeled after the DSM-IV (APA, 1994) criteria for diagnosis of adult pathological gambling. Each item endorsed is given a score of 1, with a score of 4 or greater being the scoring criteria for pathological gambling. Fisher concluded, with her population of young fruit machine players, that the DSM-IV-J is as an effective discriminator of pathological gambling in children and adolescents.

Gambling Questionnaire (Appendix B): This is a revised version of the questionnaire developed by Gupta and Derevensky (1996). This questionnaire is self-administered and takes approximately 25 to 30 minutes to complete. Specifically, this revised questionnaire taps six general domains related to gambling behavior: *Descriptive information* including prevalence, types of activities, wagers, social milieu, *cognitive perceptions* including self-perceived perceptions of their gambling behavior and the notion of skill vs. luck as it pertains to gambling (7 point Likert-scale), *familial history* such as parental gambling behavior, and *comorbidity* with other addictive and delinquent behaviors. The questions within each domain are discrete, analyzed individually, and no cumulative scores are calculated.

Procedure

Consent forms and a cover letter describing the purpose of the study were distributed to parents via the administration of the participating schools. All students with parental permission and willing to participate were included in the study. The paper-pencil instruments were group administered in their classrooms and/or school gymnasiums. Students were ensured confidentiality and were required to work individually. Each participant was assigned an identification code, which was noted on all forms, and no student was asked to provide their name. Teachers were not present during the administration of the questionnaires. Rather, research assistants were present at all times to answer any questions. Students required approximately 45 minutes to complete the instruments.

Results

Prevalence of Gambling

Of the total adolescent sample, 80.2% report having gambled during the past 12 months with 35.1% reportedly gambling at least once per week. The DSM-IV-J criteria for pathological gambling was met by 4.7% of the sample. Five percent of all adolescent gamblers reported having stolen money for purposes of gambling and 17% borrowed money to gamble. The mean age of onset of gambling behavior for the entire sample is reported to be 11.5 years of age. With respect to the identified pathological gamblers, 50% indicated steeling money and 55.3% reported borrowing money to fund their gambling, with the mean age of onset of their gambling behavior being 10.9 years. Gender Differences

Males were found to be equally as likely to gamble as females, with 81.5% of males and 78.8% of females reporting having gambled in the past year (χ^2 (1, 816)= .996, p< .318). However, males (46%) were two times more likely to gamble on a regular basis (a minimum of once per week) than females (22.5%) (χ^2 (1, 633)= 41.92, p<.001). Gender differences are highly evident with respect to pathological gambling, with 7.2% of males and 2.0% of females meeting the criteria for pathological gambling (χ^2 (1, 816)= 12.42, p<.001), using the DSM-IV-J. Stealing money to gamble was reported by 6.4% of male gamblers, but by only 3.2% of female gamblers (χ^2 (1, 633)= 4.04, p<.04). Twenty-one percent of male gamblers and 13% of females gamblers admitted to borrowing money in order to gamble (χ^2 (1, 633)= 8.33, p<.04). Males reported gambling at 11 years, 6 months, and females at 11 years, 7 months respectively (\underline{t} (1, 622)= .622, p<.534).

Within the group of pathological gamblers, 13 of the 30 males (43.3%) and 6 of the 8 females (75%) indicated stealing money for gambling purposes. A reliable chi-square analysis could not be performed due to one cell size being smaller than 5 (n=2 for females who did not report stealing). With respect to borrowing money to gamble, 56.7% of males and 50% of females reported doing so (χ^2 (1, 37)= .114, p<.736).

Developmental Differences

Developmentally, rates of gambling participation show little variability across age groups with 79.1% of grade 7, 78.9% of grade 9, and 83.4% of grade 11 students reporting having gambled in the past 12 months (χ^2 (2, 816)= 2.03, p<.363). Similar results were obtained for weekly gambling, with 30.4% of grade 7, 37.4% of grade 9 and 37.1% of grade 11 students gambling at least once per week (χ^2 (2, 816)= 3.31, p<.191). Rates of pathological gambling based on the DSM-IV-J are 4.7% for grade 7, 5.7% for grade 9, and only 3.1% for grade 11 (χ^2 (2, 816)= 1.91, p<.384). Stealing for gambling purposes was reported by 5.4% of grade 7, 6.0% of grade 9, and 2.7% of grade 11 gamblers (χ^2 (2, 663)= 2.6, p<.272). Borrowing for purposes of obtaining gambling money was reported by 19.6% of grade 7, 18.2% of grade 9, and 12.4% of grade 11 students (χ^2 (2, 663)= 4.11, p<.128). The ages at which the adolescents reported first gambling were found to differ significantly depending on their present grade level, with the vounger students reporting an earlier age of onset than the older students, the mean ages of onset being 10 years, 2 months (SD= 1.86) for grade 7, 11 years, 6 months (SD= 2.27) for grade 9, and 13 years, 2 months (SD= 2.63) for grade 11 students (\underline{F} (2, 625)= 78.77. p<.001).

Stealing money to gamble was indicated by 66.7% of grade 7, 47.4% of grade 9, and 28.6% of grade 11 pathological gamblers. Borrowing money for to gamble with was reported by 58.3% of grade 7, 57.9% of grade 9, and 42.9% of grade 11 pathological gamblers. Chi-square analyses could not be reliably computed due to the small cell sizes for the grade 11 pathological gambling group (n= 7).

Comorbidity

The adolescents also provided information concerning their alcohol consumption, drug use and cigarette smoking. With reference to the entire sample, rates of regular (at least once per week) gambling involvement (35.1%) exceed the regular alcohol use (13.5%), illicit drug use (13.8%), and cigarette smoking (17.4%), making gambling the most popular activity of an addictive nature amongst this high school population. A developmental perspective reveals this to be true for all age groups as well (see Table 2).

TABLE 2

Activity	Total reported use N= 817		Weekly use N=817			
	Gr 7	Gr 9	Gr 11	Gr 7	Gr 9	Gr 11
Alcohol	36.8%	62.2%	79.8%	7.4%	14.0%	20.2%
Drugs	3.5%	13.4%	26.5%	3.5%	13.4%	26.5%
Cigarettes	18.2%	34.5%	48.4%	7.0%	16.1%	31.4%
Gambling	79.1%	78.9%	83.4%	30.4%	37.4%	37.1%

Reported involvement in addictive behaviors for grades 7, 9, and 11

Pathological gamblers engage in other addictive behaviors to a greater extent than non-pathological gamblers. Figure 1 provides a comparison of the non-pathological gamblers to the pathological gamblers with respect to regular (at least once per week) substance use. Pathological gamblers differ significantly from non-pathological gamblers in their regular drug (χ^2 (1, 816)= 11.40, p<.001), alcohol (χ^2 (1, 816)= 38.74, p<.001) and cigarette use (χ^2 (1, 816)= 42.17, p<.001).

A comparison of pathological and non-pathological gamblers highlights several meaningful differences (Table 3). The pathological gamblers are more likely to have a mother (χ^2 (1, 816)= 11.80, p<.001) and/or father (χ^2 (1, 816)= 9.44, p<.002) with a gambling problem, were almost 5 times more likely to have legal actions pending against them (χ^2 (1, 816)= 20.69, p<.001), 25 times more likely to have stolen (χ^2 (1, 816)=

179.67, p<.001), and 4 times more likely to have borrowed money to fund their gambling behavior (χ^2 (1, 816)= 816, p<.001) than non-pathological gamblers.



Figure 1.- Percentage of regular drug, alcohol, and cigarette use: A comparison of pathological and non-pathological gamblers

A higher percentage of pathological gamblers, as compared to gamblers without problems (social gamblers), reported going on trips for the primary purpose of gambling $(\chi^2 (1, 816) = 16.71, p < .001)$, reported that gambling makes them feel important $(\chi^2 (1, 816) = 34.89, p < .001)$, and reported seeking help for an addiction $(\chi^2 (1, 816) = 11.79, p < .001)$. Adolescents with an addiction to gambling report higher rates of suicide ideation $(\chi^2 (1, 816) = 12.53, p < .001)$ but did not report significantly higher rates of suicide attempts $(\chi^2 (1, 816) = .493, p < .483)$ than non-pathological gamblers.

Types of Gambling Activities

With respect to the entire sample of adolescents, the most popular gambling activity was found to be card playing. This was followed by lottery tickets, bingo, sports pools, sports lottery tickets, games of skill, slot machines, and video poker (Table 4).

Although under the legal age, 7.5% of respondents reported gambling in casinos. Of those reporting gambling in casinos, 50% of their time is reportedly spent on slot

machines, 26% of their time is spent playing blackjack, 8% of their time in playing roulette or keno, and 2% of their time is spent playing baccarat. The remainder of their time is allocated to other card games and/or watching others gamble.

TABLE 3

	Non-Pathological gamblers	Pathological gamblers
	(3 <u>< on DSM-IV-J</u>)	(4+ ĎSM-ľV-J)
	n= 617	n= 38
Mother a problem gambler [†]	1.9%	10.5%
Father a problem gambler [†]	8.8%	23.7%
Legal actions pending	4.4%	21.1%
Stolen money for gambling	2.1%	50.0%
Borrowed money for gambling	14.7%	55.3%
Go on a trip for gambling	2.1%	13.2%
Gambling makes them feel		
important	4.1%	26.3%
Sought help for an addiction	1.9%	10.5%
Suicidal ideation	28.4%	55.3%
Suicide attempt	5.3%	8.0%

A comparison of adolescents with and without a pathological gambling problem

[†] Parental reports were not ascertained. Percentages are based on students reported perceptions of parental gambling.

Gender Differences

The two most popular gambling activities amongst male respondents are card playing (60.2%) and sports lottery tickets (49.0%). Sports pool betting and purchasing lottery tickets remain popular as well (48.7%). For females, the most popular gambling activities were purchasing lottery tickets (56.2%), playing cards (52.1%), and bingo (43%). Table 5 provides the percentages comparing male and female participation on the different types of gambling activities.

TABLE 4

A description of the gambling activities of adolescents

Type of	Less than once	Once per week	Total
activity	per week	or more	
	n= 817	n= 817	n= 817
Cards	44.8%	11.4%	56.2%
Lottery tickets	42.2%	10.2%	52.4%
Bingo	32.3%	2.9%	35.2%
Sports pools	25.2%	8.8%	34.0%
Sports lottery tickets	20.3%	9.9%	30.2%
Games of skill	23.0%	5.4%	28.4%
Slot machines	16.8%	2.9%	19.7%
Video poker	9.4%	3.2%	12.6%

TABLE 5

A comparison of males and females on the different gambling activities

Activity	Less than once per wcek		Once per week or more		Total	
	Males n=417	Females n=400	Males n=417	Females n=400	Males n=417	Females n=400
Cards	43.9%	45.8%	16.3%	6.3%	60.2%	52.1%*
Lottery	37.2%	47.4%	11.5%	8.8%	48.7%	56.2%*
Bingo	24.5%	40.5%	3.4%	2.5%	27.9%	43.0%**
Sports pools	32.9%	17.3%	15.8%	1.5%	48.7%	18.8%**
Sports lottery	30.8%	9.5%	18.3%	1.3%	49.1%	10.8%**
Games of skill	27.1%	18.8%	8.6%	2.0%	35.7%	20.8%*
Slot machines	18.2%	15.3%	4.1%	1.8%	23.3%	17.1%
Video poker	1 <u>2.</u> 9%	5.8%	4.1%	2.3%	17.0%	8.1%**

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* Statistically significant (p<.05) as tested by Pearson chi-square analysis ** Statistically significant (p<.001) as tested by Pearson chi-square analysis

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Eight percent of males and 6.5% of females reported gambling at a casino (χ^2 (1, 816)= 1.08, p<.299). The participants were asked to indicate the percentage of time at the casino spent on each of the casino gambling venues. Slot machines were the most preferred casino activity by both males and females, although females attributed a greater percentage of their time at a casino to these machines (59% and 44% respectively). Males reported spending 6% of their time at the casino playing keno, whereas females spend 10% of their time on this activity. In contrast, males devoted, on average, 30% of their time playing blackjack whereas females were less attracted to blackjack (7% of their time).

The three most popular gambling activities amongst grade 7 adolescents are purchasing lottery tickets (46.6%), playing bingo (42.6%), and betting in sports pools (29.1%). For grade 9 adolescents, the three most engaged in gambling activities are purchasing lottery tickets (50.3%), betting in sports pools (36.6%), and playing sports lotteries (21.7%). For grade 11 students the most engaged in activities were the lottery (61.9%), participating in sports pools (35.9%), and playing games of skill (35.4%) (e.g., activities that are skill driven which they perform themselves such as playing pool, bowling, or hockey for money). Bingo remains a popular activity for grade 9 (31.9%) and 11 (31.8%) students. As expected, the percentages of those reporting gambling in casinos increases with age, the percentages being 1.6%, 3.6%, and 20.2% for grades 7, 9, and 11 respectively (χ^2 (1, 816)= 72.45, p<.001).

Familial and Social Influences

Of those who gamble, 73% report gambling with friends, 65.3% gamble with family members (including parents, siblings, and extended relatives such as grandparents, aunts, uncles, and cousins), 24.1% gamble alone, and 4.7% gamble with strangers. These categories are not mutually exclusive such that the same individuals who gamble with friends may also gamble with family, strangers, or alone.

Male and female adolescents differ somewhat on with whom they engage in gambling. Females report gambling with family members considerably more than males,

the percentages being 73% and 59.5% respectively (χ^2 (1, 816)= 10.35, p<.001). This difference is largely accounted for by those individuals who gamble with their parents, with 40.6% of females and 23.1% of males reporting doing so. Males are more inclined to gamble with their friends or alone, than females. Nonetheless, these still remain popular choices amongst females (See Table 6).

TABLE 6

With whom gambling occurs	Males n= 340	Females n= 315
Parents	23.1%	40.6%**
Siblings	33.6%	41.9%*
Relatives	39.8%	44.4%
Friends	83.3%	63.5%**
Strangers	5.8%	3.5%
Alone	29.1%	19.4%**

With whom male and female adolescents gamble

* Statistically significant (p<.05) as tested by Pearson chi-square analysis

** Statistically significant (p<.01) as tested by Pearson chi-square analysis

Developmentally, a decreasing trend is evident with age for those who report gambling with family members, the percentages being 77.5%, 66.8% and 52.7% for grade 7, 9, and 11 students respectively (χ^2 (2, 663)= 24.98, p<.001). In Table 7 the percentages for gambling involvement with specific family members are provided. The results indicate that as adolescents mature, they decrease their gambling participation with parents and relatives, and maintain their gambling involvement with peers. This shift takes place between grades 7 and 9 and then appears to remain relatively stable. An increasing trend with age is noted for those who report gambling with strangers. Playing with strangers can refer to sitting at a blackjack table, roulette wheel, participating in sports pools, or other activities with individuals whom they are unfamiliar. Gambling alone appears to increases with age, (although this increase does not meet statistical significance), and pertains mostly to lottery ticket purchasing, slot machine, or video poker machine playing.

TABLE 7

With whom gambling occurs	Grade 7 n= 204	Grade 9 n= 265	Grade 11 n= 186	Total n= 655
Parents	39.7%	29.0%	26.3%**	31.2%
Siblings	46.1%	37.7%	28.5%**	37.2%
Relatives	50.0%	47.2%	26.3%**	41.6%
Friends	68.1%	76.6%	76.9%	73%
Strangers	2.0%	4.9%	7.5%*	4.7%
Alone	20.6%	24.9%	28.0%	24.1%

With whom adolescents gamble by grade level

* Statistically significant grade differences (p<.05) as tested by Pearson chi-square analysis

** Statistically significant grade differences (p<.01) as tested by Pearson chi-square analysis

Independent of age, most adolescents report gambling primarily at home. A decreasing developmental trend is however noted for gambling at home, suggesting that the older respondents have other places more readily accessible to them where they can gamble, such as friends' houses, arcades, bars, casinos, and corner stores (see Table 8). The most frequently listed location for '*other*' is relative's houses, such as aunts, uncles, and grandparents, and at horse-racing tracks, and these locations are most common with the grade 7 students.

TABLE 8

Places where adolescents from grade 7, 9, and 11 gamble

Where gambling occurs	Grade 7	Grade 9	Grade 11	Total
	n= 204	n= 265	n= 186	n= 655
Home	75.5%	70.6%	55.4%**	66.8%
Friends' house	36.8%	49.4%	50.0%**	45.0%
Arcades	20.6%	31.0%	25.3%	25.7%
Bars	6.4%	15.1%	24.7%**	14.9%
Corner store	27.5%	41.9%	40.9%**	36.5%
School	33.3%	31.7%	32.3%	31.9%
Workplace	0.9%	3.4%	7.0%**	3.6%
Casino	4.9%	3.8%	28.0%**	10.8%
Bingo hall	9.8%	5.3%	8.6%	7.5%
Other	20.6%	7.9%	6.5%**	11.3%

** Statistically significant grade differences(p<.01) as tested by Pearson chi-square analysis

Reported Reasons for Engaging in Gambling Behavior

The most endorsed reason for engaging in gambling behavior is for purposes of enjoyment (79.5%), followed by the desire to make money (61.9%), excitement (59.4%), social involvement (12.4%), relaxation (7.6%), escape daily problems (3.5%), to feel older (2.6%), to alleviate depression (2.3%), and to deal with loneliness (1%) (See Table 9). There is a large degree of overlap, with the same respondents endorsing more than one reason.

TABLE 9

_	Non-problem	Problem	Pathological
Reasons	gamblers	gamblers	gamblers
	(DSM-IV-J ≤2)	(3 on DSM-IV-J)	(4+ on DSM-IV-J)
	n= 590	n= 27	n= 38
Enjoyment	77.3%	88.9%	94.7%*
Excitement	55.7%	92.6%	92.1%*
Make money	59.5%	92.6%	84.2%*
Social involvement	10.7%	22.2%	31.6%*
Escape problems	1.7%	11.1%	26.3%*
Alleviate depression	1.4%	2.4%	13.2%*
Relaxation	7.2%	7.4%	13.2%*
Feel older	1.9%	3.7%	13.2%*
Loneliness	0.5%	7.4%	2.6%
Other reasons	6.1%	3.7%	2.6%

Reported reasons for engaging in gambling behavior

* Statistically significant (p<.05) as tested by Pearson chi-square analysis

It is important to note that for adolescent problem and pathological gamblers, the reasons for engaging in gambling behaviors differ somewhat. Enjoyment, excitement, and the desire to make money are still the most popular reasons, but gambling to escape problems, alleviate depression, cope with loneliness, relaxation, and promote social involvement occurs more frequently amongst problem and pathological gamblers as compared to non-problem gamblers (Table 9). These findings suggest that as gambling problems increase in severity, the multiple purposes that gambling serves for individuals change and increase in number. It is noteworthy that gambling to make money is a less

endorsed reason by the pathological adolescent gamblers as compared to the non-problem and problem gamblers, but that the excitement factor is much more popular amongst those experiencing problem gambling and pathological gambling in comparison to non-problem gamblers. For problem and pathological gamblers, gambling is viewed as medium for stimulation, enjoyment, and a way of coping with difficulties rather than a means of monetary gain. Considering the importance of establishing the different motivational factors accounting for why individuals engage in gambling behavior, Chi-square analyses were performed for each reason, across the three levels of gambling involvement (noproblem gamblers, problem gamblers, and pathological gamblers) and the results are reported in Table 9.

Reported Self-Perceptions in Relation to Gambling Behavior

Twenty-one percent of adolescents who gamble report feeling that they gamble more than they want to, 5.6% reported feeling as though they gamble in excess, and 5.5% of gamblers indicated that gambling makes them feel important. Gamblers were asked to rate their perceived gambling *ability* on a 7 point Likert scale, ranging from very poor (1) to excellent (7). The reported mean for the entire sample of gamblers is 3.89 (SD= 1.45), which is slightly above the average. The pathological gamblers indicated a significantly higher mean of 4.93 (SD= 1.03) as compared to non-pathological gamblers (M= 3.82, SD= 1.44) ($\underline{t}(1, 659)$ = 4.676, p<.001), fostering a belief in an illusion of control.

Gender differences were found, with 12.0% of female and 29.9% of male gamblers reporting a belief that they gamble more than they believe reasonable (χ^2 (1, 663)= 32.83, p<.001). Three percent of females and 7.9% of males feel as though their gambling behavior is excessive (χ^2 (1, 663)= 7.28, p<.007). Furthermore, gambling reportedly makes 6.7% of males and 4.1% of females feel important (χ^2 (1, 663)= 2.37, p<.124). Gender differences were noted with respect to their reported perceived gambling ability, the means being 3.47 (SD= 1.44) for females and 4.28 (SD= 1.34) for males on a 7 point Likert scale, ranging from poor (1) to excellent (7) (<u>t</u> (659)= -7.43, p< .001). Developmentally, 13.7% of grade 7, 23.8% of grade 9, and 23.1% of grade 11 students who gamble report that they gamble more than they want, indicating an increase from grade 7 to 9 (χ^2 (2, 663)= 10.33, p<.006). Those who feel they gamble in excess show an increase from grade 9 to 11(χ^2 (2, 663)= 11.86, p<.005), with the percentages being 4.4%, 4.5%, and 8.8% for grades 7, 9, and 11 respectively. This is an interesting finding considering the rate of pathological gambling was lowest for the grade 11 adolescents. Adolescents of all ages were equally likely to report that gambling makes them feel important (χ^2 (2, 663)= .218, p<.897), the percentages being 5.4% for grade 7, 6.0% for grade 9, and 4.8% for grade 11. Gamblers did not perceive their gambling ability to increase with age, the means being 3.81 (SD= 1.58), 3.96 (SD= 1.44), and 3.86 (SD= 1.29) on a 7 point Likert scale (<u>F</u> (2,658) = 0.676, p<.51) for grades 7, 9 and 11.

Those individuals engaging in gambling activities were required to indicate the amount of luck and skill they perceive to be involved in gambling activities. Both variables were measured with a 7 point Likert scale ranging from none (1) to a lot (7). Overall, the students who gamble indicated a mean of 5.69 (SD= 1.74) for the amount of *luck* required and a mean of 4.66 for the amount of *skill* required to be a good gambler. This finding indicates that although they perceive gambling to be primarily luck driven, they also believe that skill plays a meaningful and important role, thus endorsing an illusion of control. However, this finding may be contingent upon the gambling activities in which they are engaging. When comparing non-pathological gamblers (M= 4.63, SD= 1.85) to pathological gamblers (M= 5.22, SD= 1.65) no significant differences emerged for perceived skill (t(812)= 1.89, p<.059) or perceived luck (non-pathological gamblers, M= 5.59; pathological gamblers, M= 5.68) (t(812)= -.021, p< .983) involved in gambling activities.

Gender differences were found with respect to the amount of perceived luck involved in gambling activities, with males endorsing the role of luck (M= 5.82, SD= 1.66) more so than females (M= 5.56, SD= 1.81) ($\underline{t}(814)$ = -2.22, \underline{p} < .026). However,

males and females both agree on the amount of skill involved, with both males and females obtaining a mean of 4.60 (SD= 1.89, SD= 1.80 respectively) on the Likert scale. Similarly, within the group of pathological gamblers, gender differences are reflected in the perceptions of the amount of luck is involved in gambling (t (1, 37) = -2.31, p < .027), with males endorsing greater amounts of luck needed (M= 6.03, SD= 1.63) than females (M= 45.375, SD= 2.34). Male and female pathological gamblers do not differ in their perceptions of the role that skill plays in gambling (t (1, 37) = -.129, p < .898) <u>Clinical Interpretation of the Response Patterns on the DSM-IV-J</u>

An analysis of the items endorsed on the DSM-IV-J by the 38 identified pathological gamblers provides clinically meaningful information concerning the most frequently reported problems by these youth (see Table 10). The most endorsed question by the pathological gamblers on the DSM-IV-J refers to a preoccupation of constantly thinking about gambling activities and planning the next gambling venture. Lying to friends and family about their gambling behavior, and chasing their gambling losses were also highly endorsed. Missing school for gambling purposes was the item with the lowest endorsement, indicating that these pathological gamblers are managing to sustain their gambling outside of school hours. The question concerning whether family relationships have been destroyed by their gambling was relevant to only 10.5% of this group of pathological gamblers. This is surprising considering the percentage of those who report lying to their families, and stealing money from them. It is likely that most of the adolescent pathological gamblers have been able to hide their gambling problem from their families.

TABLE 10

Percentages of affirmative responses endorsed to each question

of the DSM-IV-J by identified pathological gamblers

Question items on the DSM-IV-J	Pathological gamblers n=38
Do you often find yourself thinking about gambling activities at odd	0.1.67
times of the day and/or planning the next time you will play?	81.6%
Do you lie to your family or friends or hide how much you gamble?	78.9%
After spending money on gambling activities do you play again another day to try and win your money back? (More than half the time)	73.7%
In the past year have you spent your school dinner money, or money for bus fares, on gambling activities?	68.4%
In the past year have you taken money from someone you live with, without their knowing, to gamble?	57.9%
Do you ever gamble as a way of escaping problems?	50.0%
Do you find you need to spend more and more money on gambling activities?	36.8%
In the past year, have you stolen money from outside the family, or shoplifted, to gamble?	28.9%
Do you become restless, tense, fed up, or bad tempered when trying to cut down or stop gambling?	26.3%
In the past year, have you gone to someone for help with a serious money worry caused by participation in gambling?	21.1%
Have you fallen out with members of your family, or close friends, because of your gambling behavior?	10.5%
In the past year, have you missed school to participate in gambling experiences? (5 times or more)	7.9%

Discussion

The results clearly indicate that a small but identifiable number of adolescents (4.7%) have a significant gambling problem. Gambling was found to be the most popular activity of a potentially addictive activity readily engaged in on a regular basis (at least once per week) by 28.2% of adolescents. The gambling rates of these adolescents surpassed those for regular cigarette smoking (17.4%), regular alcohol consumption (13.5%), and the regular use of illicit drugs (13.8%). This was found for both males and females, at all

grade levels. The average age at which these individuals reported having started gambling is 11.5 years, underlying the urgency of needing to target prevention efforts at the elementary school level. Pathological gamblers reported a mean age of 10.9 years for gambling onset. Rates of gambling involvement showed little variability across age groups indicating that it is a popular pastime for the vast majority of high school students.

Most adolescents gamble in their own homes, more than any other location. These findings are consistent with those obtained with children aged 9 to 14, of whom almost 90% reported stating gambling with family members (Gupta & Derevensky, in press).

Another very revealing finding is the fact that adolescents endorsed the belief that significant amounts of both luck and skill are necessary to be a successful gambler. Similar results were observed with children in grades 4, 6, and 8 (Gupta & Derevensky, in press). Thus, although the youth are aware that gambling is primarily luck driven, they also believe that they can exert meaningful amounts of skill while gambling, endorsing an illusion of control. Males reported higher levels of self-perceived skill for gambling activities than females. This may contribute to the higher percentage of males engaging in gambling behavior. Previous research with elementary school children as young as nine years of age reported similar findings, with the highly endorsed belief that skill and luck are both required to large degrees in gambling activities (Gupta & Derevensky, 1996).

Developmentally, the rates of pathological gambling were found to be higher on average for grade 7 than grade 11 students. This is consistent with other studies and has been explained by the notion that adolescents may experience a natural recovery and *grow out* of the gambling problem as they mature (Shaffer & Hall, 1996; Shaffer & Jones, 1989). Although only longitudinal research studies can directly confirm or disconfirm this hypothesis, the authors acknowledge that maturation may account for some of the decrease in number of pathological gamblers from one cohort to the next. It seems more likely that what *appears* to be a decrease in the prevalence rate of pathological gambling from one age group to the next may in fact be a cohort effect, such that individuals in grade 7 have had different exposure to gambling than those in grades 9 and 11. Thus, what may appear to be a decreasing prevalence rate may be only masked by time. As this cohort of grade 7 matures, it is predicted that their prevalence rates of pathological gambling, in a couple of years, will be higher than those found in the adolescents presently in grades 9 and 11. Thus, in reality, it is argued that when following a cohort longitudinally, differences in prevalence rates would likely increase. This is in contrast to the decreasing prevalence of problem gambling amongst adolescents found in developmental studies incorporating cross sectional designs. Results revealed that the younger students report starting to gamble at even younger ages than the older students. The average age at which grade 7 students reported starting to gamble was ten years, whereas the grade 11 students reported the onset of their gambling to be approximately thirteen years. Other research concerned with addictive behavior have shown that the severity of problems associated with an addictive behavior are greater amongst those who start at young ages (Bailey, Flewelling & Rachal, 1992; Custer, 1982; Dell, Ruzicka, & Palisi, 1981; Harrison & Luxenberg, 1995; Wynne et al., 1996). Recent research studies have confirmed that gambling is a common activity amongst elementary school children, as early as 8 years of age (Gupta & Derevensky, 1996; Ladouceur & Dubé, 1994). Recently, Stinchfield and colleagues (1997) reported encouraging findings that gambling prevalence rates among Minnesota public school students did not increase between 1992 and 1995. The authors however cautioned that due to the widespread accessibility and advertising of gambling venues, it is necessary to continue to monitor the prevalence of youth gambling.

The most reported reasons for gambling is for the enjoyment and excitement that it provides, which is consistent with our previous findings with younger children (Derevensky, Gupta, & Della Cioppa, 1996; Gupta & Derevensky, 1996) and adults (Powell, Hardoon, Baboushkin, Gupta, & Derevensky, 1996). However, problem and pathological gamblers are more likely to report gambling for reasons of escape, to alleviate depression, to promote relaxation, and to cope with loneliness. Therefore, gambling may

be viewed as a *vehicle* (Jacobs, personal communication) that transports problem and pathological gamblers to a fantasy place without daily life hassles, depression, anxiety or loneliness via dissociation. The reported reasons for engaging in gambling activities directly supports Jacobs' (1986) General Theory of Addictions, supporting his contention that all addictions serve the common purpose of escape. The implications of this theoretical stance are numerous, requiring further examination. Future research efforts into examining which individuals are at heightened risk for developing an addiction to gambling will provide valuable information which can be directly translated into prevention curricula for elementary and secondary schools as well as treatment programs.

Adolescent pathological gamblers differed from social, non-problem gamblers on many dimensions. For instance, pathological gamblers are more likely to have a parent who gambles excessively, a finding reported by Winters, Stinchfield, and Fulkerson, (1991). This is not surprising since children of problem gamblers are likely to learn from their parents that gambling is an acceptable activity, and that it is a way to escape from problems. As with most behaviors, children often follow the example of their parents. Social learning theorists, such as Bandura (1977, 1986), have long contended that vicarious learning and modeling play an important role in shaping individual behaviors. For children, social learning theorists further posit that individuals are more likely to imitate and model those individuals they value, such as parents, siblings, peers, and those perceived as 'significant others', especially if the individuals are rewarded for their actions.

The results further suggest that pathological adolescent gamblers differed from their peers on other dimensions. They reported that gambling makes them feel important more than their non-pathological peers. This finding is alarming as it suggests that the gambling activity fulfills such a substantial need for these youth. Excessive gambling makes adolescents feel good and important despite all the problems associated with their gambling addiction. As such, this is likely a major factor in maintaining their gambling behavior. Adolescent pathological gamblers were also more likely to report engaging in illegal acts,

stealing and borrowing money to finance their gambling habits. The pathological gamblers reported a higher incidence of suicide ideation (55.3%) than gamblers who do not experience many of these problems. It is unclear whether these suicidal tendencies are a direct result of the gambling addiction or whether these individuals were at suicidal-risk before the onset of their gambling, thus turning to gambling as a way to escape their problems. Either hypothesis is likely, and both may be relevant. This issue of suicidal tendencies amongst adolescent pathological gamblers warrants further investigation. Anecdotally, numerous adolescents approached the research assistants upon completion of the questionnaires with statements such as, "...we don't drink much, we don't do drugs, but many of us have gambling problems. Aren't you going to help us?"

Bingo is a gambling activity that has received little attention in the literature to date. Although bingo halls are growing in number and in popularity, little is known about which types of individuals gamble in bingo halls. This study revealed that bingo is a popular gambling activity amongst adolescents. Females, in general, were more likely to report gambling in bingo halls, although males are more likely to do so on a weekly basis. As well, the grade 7 cohort indicated playing bingo more so than the older adolescents. Considering that younger adolescents are more likely to gamble with family members, it is possible that they play bingo with their parents and grandparents, and that as they get older, they shift to gambling with their peers rather than playing bingo. The ability to increase one's stake in bingo is generally limited, thereby minimizing one's level of excitement. Older students, because of their physical stature, have easier access into other gambling venues.

With the infusion of numerous casinos and the surge of gambling opportunities in most communities throughout Canada and the U.S., more and more children are exposed to the "gambling industry" at younger and younger ages, be it through their parents, friends, strangers, or the media (via television commercials, radio, or billboards). Results from elementary school children support the finding that most children gamble with their

families, as their fist exposures to gambling (Gupta & Derevensky, in press). The fact that more adolescents at each grade level gamble on a regular basis than they smoke cigarettes and consume alcohol may be a consequence of exposure to parental gambling, a lack of prevention and awareness in the schools, and the vast accessibility of gambling opportunities. There is little doubt that a large percentage of youth are exposed to parental smoking and alcohol use as well. They are, however, also exposed to prevention programs and media and school campaigns which informs them that these behaviors can lead to addiction and devastating consequences. While many parents view gambling as an acceptable 'harmless' behavior, few would permit their children to engage in repeated alcohol and drug use. It is unfortunate that today's adolescents afflicted with gambling addictions were not warned and informed about the potentially addictive nature of gambling activities. Gambling is really the only addictive activity that youngsters are exposed to on a daily basis that is not counterbalanced by negative parental attitudes and social outreach projects exerting prevention and awareness efforts. Such prevention efforts are long overdue and desperately needed. Parents could benefit from educational information outlining the consequences of exposing their children to irresponsible gambling behavior (e.g., loss of control, exceeding financial limits, excessive time spent on gambling, chasing losses). Furthermore, if schools could be convinced of the importance of gambling awareness, information and prevention may be incorporated into already existing mental health programs.

The DSM-IV-J items endorsed by the majority of the pathological gamblers provides meaningful insight into their thinking. One major characteristic of addictions, in general, is a mental preoccupation with when and how one will obtain their next contact with their focus of addiction, be it gambling, drugs, alcohol, food, or sex (APA, 1994), and this was supported by our findings. Actually, problem and pathological gamblers endorsed the item referring to preoccupation more than any other, and this may have serious implications for school success if they are preoccupied and unable to focus while

performing academic tasks. Lying to loved ones about their gambling behavior in order to hide their addiction is the second most prevalent problem related to their pathological gambling.

The prevalence rates of pathological gambling in this study are markedly lower than the rates established in the recent Alberta study (Wynne et al., 1996) which found 8% of adolescents meeting the criteria. This discrepancy may imply that Alberta has a higher percentage of adolescent pathological gamblers than found in Quebec. However, the discrepancy may also be explained by the fact that different measures were used to estimate the prevalence rates. The present study used the DSM-IV-J, a direct adaptation of the DSM-IV criteria for pathological gambling, for use with adolescents. The DSM-IV, by its very nature, is a diagnostic instrument used in clinical settings whereas the SOGS, used in the Alberta study, is more of a screening tool. The DSM-IV-J is likely the most conservative of the two measures, possibly accounting for some of the discrepancy. Empirical support for this premise has been found by Derevensky and Gupta (1997) who examined prevalence rates older adolescents using the SOGS-RA, DSM-IV-J, and the Gamblers Anonymous Twenty Questions, and concluded the DSM-IV-J to be the most conservative measure.

While no single *profile* of a compulsive adolescent gambler exists, the correlates of gambling behavior as well as the differential responses on the DSM-IV-J are important clinical markers for treatment. Juvenile problem gambling is a fairly new phenomenon with which clinicians, researchers, parents, teachers, and educators must contend. Research in this domain must continue, and social policy reform must be advocated until effective awareness, prevention, and treatment programs are an integral part of all communities.

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STUDY II

Personality characteristics and risk-taking tendencies among adolescent gamblers

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Abstract

Eight hundred and seventeen high school students in the Montreal region completed the DSM-IV-J diagnostic gambling measure, the High School Personality Questionnaire (HSPQ), the Zuckerman Sensation Seeking Scale (SSS), the Arnett Inventory of Sensation Seeking (AISS), along with the Gambling Questionnaire devised by the authors inquiring about the frequency of gambling participation and the types of activities in which they engage. The sample of adolescents was divided into four different groups based upon their frequency of gambling involvement and performance on the DSM-IV-J, non-gamblers, occasional gamblers, regular gamblers, and problem and pathological gamblers. This research sought to investigate whether individuals belonging to the different groups differ on personality and risk-taking dimensions. Results indicate that the four groups of adolescents differed on 10 of the 14 personality factors assessed by the HSPQ, as well as on the Boredom Susceptibility, Experience Seeking, and the Disinhibition subscales of the SSS, and the Intensity subscale of the AISS. The findings suggest that there exists qualitative differences in personality and risk-taking styles for adolescents based upon the severity of their gambling behavior, lending support to the premise that there exist certain types of individuals who are more susceptible, or more likely to develop an addiction to gambling.

Review of the literature

The gaming industry has emerged as one of the fastest growing segments in the economy. For most individuals, gambling remains an enjoyable, harmless diversion from everyday life, and is simultaneously stimulating and entertaining. Nevertheless, a small percent of individuals are unable to control their gambling behavior, and report feeling compelled to gamble repeatedly, with little self-control. Unlike previous generations of adolescents, today's adolescents are faced with a multitude of gambling opportunities. Lotteries, video lottery terminals (machines which play a number of games including blackjack, roulette, poker, keno), poker machines, and sports betting are widespread. While minors under the age of 18 are not meant to have access to gambling venues, the majority of adolescents gain access nonetheless.

A growing population of children and adolescents are engaging in gambling activities (Derevensky & Gupta, 1996; Jacobs, 1989, in press; Rupcich, Govoni, & Frisch, 1995; Volberg, 1989; Wynne et al., 1996). Researchers, clinicians and educators remain concerned since severe gambling problems originate during childhood and adolescence (e.g., Custer, 1982; Dell, Ruzicka, & Palisi, 1981; Griffiths, 1990). Numerous prevalence studies confirm that 5-8% of adolescents are pathological gamblers (Derevensky & Gupta, 1996; Fisher, 1992; Jacobs, in press; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987; Shaffer & Hall, 1996; Wynne et al., 1996), that 24-40% engage in some form of weekly gambling behavior (Huxley & Carrol, 1992; Ladouceur & Mireault, 1988; Lesieur & Klein, 1987), with rates of pathological gambling higher amongst the adolescent population than adults (e.g., Derevensky & Gupta, 1996; Lesieur & Klein, 1987; Jacobs, 1987, Shaffer & Hall, 1996; Study I; Wynne et al., 1996). More adolescents engage in gambling than in any other potentially addictive behavior, including alcohol, drugs, and cigarettes (Study I). And while there remains some contradictory evidence, the number and percentage of adolescent who gamble appears to be rising. Although Stinchfield et al. (1997) report a slight decrease in the overall prevalence rates of adolescent gambling behavior in Minnesota between 1992 and 1995, they nevertheless report, that there was "limited support for the hypothesis of increased gambling among youth" (p.44).

Adolescents with significant gambling problems find themselves preoccupied thinking about gambling activities, planning their next gambling excursion, lying to family and friends, chasing losses, and stealing money (Study 1). Poor academic performance, socialization and familial problems, and legal problems are but a few of the consequences for adolescents exhibiting compulsive gambling behavior. Equally disturbing are the findings that these behaviors appear to be socially acceptable to parents (Gupta, & Derevensky, in press), and that the onset of these behaviors begins in pre-adolescence (Study 1; Wynne et al., 1996).

Gambling and Related Personality Constructs

The view that there is some underlying personality type at the root of addictive behavior first originated with personality trait theorists. The research to date indicates that there may be several different personality profiles which characterize pathological gamblers. Bellaire and Wolfgang (1992) reported that pathological gamblers could be divided into three distinct personality subgroups; those suffering from serious personality disorders (48%), individuals with severe debilitating interpersonal relationships (29%), and those with severe psychiatric disorders (22%) (i.e., schizophrenia and manic depressive illness). Other researchers have found male pathological gamblers to have personality disorders, paranoia, emotional instability, alcoholism (Graham & Lowenfeld, 1986), to be highly impulsive (Hraba, Mok, & Huff, 1990), to score higher on neuroticism and psychoticism scales (Roy, Custer, Lorenz, & Linnoila, 1989), to be highly energetic, to have above average intelligence, (Peck, 1986), and to be highly distractible individuals who tolerate boredom poorly (Custer, 1980).

Although many personality tests have been used in research with pathological gamblers, no real clear "gambler's personality" profile emerges. Considering that most

studies are conducted with adults already in treatment, the results are tenuous at best. Furthermore, it is still unclear as to whether the personality traits identified preceded, and thus contributed to pathological gambling, or followed as a result of a severe gambling problem. The ideal research design to examine this question would be prospective investigations. However, examining personality characteristics in young teenage gamblers provides meaningful insight into the occurrence of pre-existing personality traits since their gambling patterns are relatively new and are unlikely to have altered their personality profiles significantly. Support for this hypothesis comes from Sharma (1995), who examined the relationship between drug dependence and personality traits, and concluded that the addictive personality precedes addiction, and that addiction itself does not create the addictive personality.

By reconciling clinical diagnostic categories, such as an addiction, with psychologically relevant personality dimensions, a greater understanding of the underlying mechanisms can be obtained, and a clearer path is paved toward the application and development of prevention and treatment programs. Numerous personality dimensions are linked with their biological correlates, and several researchers have included biological differences in their theories of personality constructs. Eysenck (1967) proposed that two aspects of arousal distinguish the Extroversion (E) and Neurosis (N) dimensions of his personality theory. He proposed that the biological basis of neurosis is founded in the sensitivity of the limbic-autonomic system that tends to be highly reactive to environmental and psychological stimuli. In contrast, he suggested that the biological basis of extroversion is more closely related to the level of arousal in the neocortex, as modulated by the ascending reticular activating system, with individuals high on the E dimension having a low level of cortical arousal. These individuals would not be as reactive to stimuli and require larger amounts of stimulation to maintain an optimal level of cortical arousal, thus resulting in extroverted social behavior. Zuckerman (1979) postulates a number of interesting links between biological processes and the personality construct of sensation

seeking. Sensation seeking appears to be correlated with the Evsenck's E dimension. especially the impulsivity factor of the E dimension (Farley & Farley, 1970). Individuals engaging in risk-taking behaviors, such as gambling, tend to seek environments with high levels of arousal in an attempt to compensate for low cortical arousal (Eysenck, 1981). Low cortical arousal is associated with distractibility, high motor activity levels, and extroverted social behavior. Under-arousal and high sensation seeking have been proposed as a basis for hyperactivity in children (Satterfield, 1976; Zentall & Zentall, 1983), thus providing a logical framework for the effectiveness of pharmacological treatments with the use of stimulant drugs. A similar explanation is plausible and applicable to gamblers, with individuals experiencing low cortical arousal being attracted to the stimulation associated with gambling participation. Zuckerman's findings suggest that individuals with higher sensation seeking needs exhibit greater drug and alcohol consumption, more frequently engage in gambling activities, and are more likely to engage in high-risk activities such as drinking while driving (Zuckerman, 1994). Utilizing Zuckerman's Sensation Seeking Scale, Kuley and Jacobs (1988) found that the total sensation seeking scores of problem adult gamblers were significantly greater than those of social gamblers. Problem gamblers also scored significantly higher than social gamblers on the Disinhibition, Boredom Susceptibility, and Experience Seeking subscales. Similar findings were obtained by Dickerson, Hinchy, and Fabre (1987).

There appears to be a growing understanding that there exists predisposing characteristics which place individuals at heightened risk for an addiction, and addictions research has identified several of these possible risk characteristics. For example, Harrison and Luxenberg (1995) studied alcohol abusers from grades 6, 9, and 12 and concluded that they were 15 times more likely than other students to report lower self-esteem scores, more emotional distress, greater antisocial behavior, and an increased number of suicide attempts. Other researchers found that drug use was associated with high impulsiveness, neuroticism, low self-esteem, anxiety, and depression (Cookson, 1994). The onset of
ci3arette smoking is associated with alcohol use, risk-taking, and low self-esteem (Simon, Sussman, & Dent, 1995). Comorbidity of addictive behaviors is associated with learning difficulties, poor self-esteem, social alienation, antisocial behavior, and frequent histories of abuse (Harrison & Hoffmann, 1989).

There is no research isolating or identifying personality characteristics of adolescents who gamble, nor have any attempts been made to examine personality correlates with degree of gambling severity. The purpose of this study is to investigate whether individuals involved in different levels of gambling involvement differ in their personality traits. Adolescent problem and pathological gamblers will likely differ on measures of personality and risk-taking from those who do not gamble or those who gamble without experiencing significant problems. More specifically, it is expected that problem and pathological gamblers will differ on personality factors which reflect excitability, emotional immaturity, anxiety, and tendencies toward non-conformity. Based upon the numerous studies with adult pathological gamblers, it is expected that risk-taking indices will increase with degree of gambling participation. In fact, the differences may be more accentuated since adolescence is a period of rebellion, risk-taking and experimentation.

Method

Participants

The participants included 817 adolescents, 417 males and 400 females, from grades 7, 9, and 11 from 5 high schools in the Greater Montreal region, representing various socio-economic levels. The age range of the participants spans from 12 years to 17 years. The distribution of the sample is depicted in Table 1. Due to inaccurate completion of the High School Personality Questionnaire, 52 subjects were omitted from the MANOVA analyses, resulting in a total N of 765 subjects.

TABLE 1

Sample distribution by gender and grade

Grade	Males	Females	Total
7	117	141	258
9	190	146	336
11	110	113	223
Total	417	400	817

Instruments

The present study is part of a larger program of research. The instruments listed here pertain to the results reported for this particular study.

DSM IV-J (Fisher, 1992) (Appendix A): This 12 item instrument is a screen for pathological gambling during adolescence, modeled after the DSM-IV (APA, 1994) criteria for diagnosis of adult pathological gambling. Each item endorsed is given a score of 1, with a score of 4 or greater being the scoring criteria for pathological gambling. Fisher concluded, with her population of young fruit machine players, that the DSM-IV-J is as an effective discriminator of pathological gambling in children and adolescents.

High School Personality Questionnaire (HSPQ) (Cattell, Cattell, & Johns, 1984): The HSPQ is a character trait inventory used to diagnose behavior problems in adolescents. It is a self-report instrument focusing on 14 personality traits: warmth, intelligence, emotional stability, excitability, dominance, conformity, boldness, sensitivity, withdrawal, enthusiasm, apprehension, self-sufficiency, self-discipline, and tension. A summary of trait descriptions (a more detailed description of the traits is presented in Appendix C) is presented in Table 2. The HSPQ can be group administered and requires approximately 45 minutes to complete. The questionnaires are hand scored, and raw scores are converted into scales scores with use of conversion tables provided. Different conversion tables are provided for males and females, with scaled scores being controlled for gender.

TABLE 2

HSPQ factors: Trait descriptions

Low score description HSPQ Factor		High score description
Cool reserved, impersonal, detached, aloof, formal	Warmth	Warm outgoing, kindly, easy going, likes people
Concrete-thinking	Intelligence	Abstract-thinking
Affected by Feelings emotionally less stable, easily annoyed	Emotional Stability	Emotionally stable mature, faces reality, calm
Phlegmatic undemonstrative, deliberate, placid, inactive	Excitability	Excitable impatient, demanding, overactive, easily distracted
Submissive humble, mild, easily led, accommodating	Dominance	Dominant assertive, aggressive, stubborn, competitive, bossy
Sober restrained, prudent, taciturn, serious	Cheerfulness	Cheerful enthusiastic, impulsive, heedless, expressive
Expedient disregards rules, self- indulgent, non-conforming	Conformity	Conforming conscientious, staid, persistent, moralistic, rule- bound
Shy threat-sensitive, timid, hesitant, intimidated	Boldness	Bold venturesome, uninhibited, can take stress
Tough-minded self-reliant, no-nonsense, rough, realistic	Sensitivity	Tender-minded sensitive, over-protected, intuitive, refined
Vigorous goes readily with group, zestful, given to action	Withdrawal	Withdrawn guarded, circumspect individualism, internally restrained
Self-assured secure, feels free of guilt, untroubled, self-satisfied	Apprehension	Apprehensive self-blaming, guilt-prone, insecure, worrying
Group-oriented a "joiner" and sound follower, listens to others	Self-sufficiency	Self-sufficient resourceful, prefers own decisions
Undisciplined self- conflict lax, careless of social rules	Self-discipline	Self-disciplined controlled, socially precise, compulsive, self-respecting
Relaxed tranquil, composed, has low drive, unfrustrated	Tension	Tense frustrated, overwrought, has high drive

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Reliability for the HSPQ is reported to be .83 for Forms A + B. The validation of the HSPQ was accomplished using both construct and criterion validation, with no fewer than 12 replications of its personality structure using factor analytic techniques (Cattell, et al., 1984), all indicating a similar factor structure. An entire chapter (chapter 8 of the manual) examines the relationship between the HSPQ and external criteria demonstrating it delineated specific factor loadings and personality profiles for academic achievement, school dropouts, general adjustment, neurotic individuals, character disorders, personality disorders, convicted and institutionalized delinquents, occupational personality profiles, amongst others.

Sensation Seeking Scale-Form V(SSS) (Zuckerman, Eysenck, & Eysenck, 1978): The SSS consists of 40 forced choice items with individuals selecting statements that best describes them. Examples include, "I like wild uninhibited parties", and "I would like to try parachute jumping". The SSS has four subscales, each comprising 10 items; Thrill and Adventure Seeking (TA) (measure of the desire to engage in sports or other activities that include speed and elements of danger), Disinhibition (DIS) (the desire to be socially and sexually disinhibited and have multiple sexual partners), Boredom Susceptibility (BS) (the extent to which one has an aversion to repetition, routine, and dull people), and Experience Seeking (ES) (the degree to which individuals seeks intellectual experiences, desires travel and/or prefers a non-conforming lifestyle). Internal reliabilities for the total scale have been found to range from .83 to .86. The SSS takes 10 to 15 minutes to complete.

Arnett Inventory of Sensation Seeking (AISS) (Arnett, 1994): The AISS has 20 items, with two subscales (Intensity and Novelty) of 10 items each. Individuals indicate the extent to which each item describes them on a four point Likert scale ranging from 'describes me very well' to 'does not describe me at all'. The validity is reported to be .41 and the internal reliability coefficient of the total scale is .70, with .50 for the

Novelty subscale, and .64 for the Intensity subscale. The AISS takes approximately 8 to 10 minutes to complete.

Gambling Questionnaire (Appendix B): This is a revised version of the questionnaire developed by Gupta and Derevensky (1996) and identifies correlates of gambling behavior such as frequency of play and types of games played, among others. For the purpose of the present study, only the question pertaining to the frequency of gambling behavior is relevant. The data obtained from the remaining of the questionnaire is reported in Study I and III. This questionnaire is self-administered and takes approximately 25 to 30 minutes to complete.

Procedure

Student volunteers with parental permission were asked to individually complete the paper-pencil instruments in groups in their classrooms or a large hall. To assure confidentiality teachers were not present during the administration of the questionnaires, and research assistants were present at all times to answer questions. Each participant was assigned an identification code, which was noted on all forms. Two data collection sessions were required, each 45 minutes in duration.

Results

A classification system was devised and all participants were grouped in one of four categories, based upon frequency and severity of gambling behavior. Group 1, non-gamblers (N= 163), consists of individuals who reported never gambling during the previous 12 months. Group 2, occasional gamblers (N= 414), includes individuals reported gambling less than once per week and indicate no gambling related problems on the DSM-IV-J (score = 0). Group 3, regular gamblers (N= 175) includes individuals who reported gambling at least once per week and report a maximum of two gambling related problems on the DSM-IV-J (score = 1 or 2). Group 4, problem and pathological gamblers (n= 65), consists of individuals who reported gambling at least once per week and report a maximum of two per week and report a maximum of two gambling related problems on the DSM-IV-J (score = 1 or 2). Group 4, problem and pathological gamblers (n= 65), consists of individuals who reported gambling at least once per week and report a maximum of two per week and report a maximum of two per week and report a maximum of two per week and problems on the DSM-IV-J (score = 1 or 2). Group 4, problem and pathological gamblers (n= 65), consists of individuals who reported gambling at least once per week and report a maximum of two p

minimum of three problems related to gambling on the DSM-IV-J. This group includes adolescents who do not quite meet the criteria for pathological gambling as well as those meeting the established criteria (4 + problems on the DSM-IV-J). The rationale behind lowering the criteria of the DSM-IV-J by 1 item was to include those who may be in the process of progressing into a diagnosis of pathological gambling as well as those who may be shifting out of a diagnosis of pathological gambling. It is our opinion that those individuals who approach the criteria for pathological gambling (a score of 3 on the DSM-IV-J) and those who are in the first stages of transgressing out of a diagnosis of pathological gambling (a score of 3 on the DSM-IV-J) share similar personality characteristics as those clearly meeting the DSM-IV-J criteria. The distribution of the total sample by group composition and gender can be found in Table 3.

TABLE 3

Sample distribution by gambling severity

Group	Grade	Grade	Grade	Total	Gender	Total
	7	9	11	M	F	Group
1	54	72	37	78	85	163
2	138	161	115	174	240	414
3	45	72	58	112	63	175
4	21	31	13	53	12	65

All analyses are presented with respect to the above group categorization system, as well as by gender and grade. A $4 \times 2 \times 3$ multivariate analysis of variance (MANOVA) was performed, including group, gender, and grade as fixed variables and the measures as dependent variables (HSPQ factors, SSS subscales, and AISS subscales). To ensure accuracy, HSPQ questionnaires from 52 participants were discarded due to suspicious completion (the last question did not indicate that the student had answered the entire measure truthfully), thus reducing the total subject pool to 765 for the MANOVA. The results of the MANOVA can be found in Table 4.

TABLE 4

Results of the MANOVA, including

the HSPQ, and the sensation seeking subscales of the SSS and AISS

Effect	Value	E	df	₽	Observed Power
GROUP					
Wilks Lambda	.731	3.141	(60, 1704)	.001	1.00
Pillai's trace	.283	2.98	(60, 1719)	.001	1.00
GRADE					
Wilks Lambda	.895	1.634	(40, 1142)	.008	.999
Pillai's trace	.108	1.63	(40, 1144)	.008	.999
GENDER		****************************			
Wilks Lambda	.842	5.360	(20, 571)	.001	1.00
Pillai's trace	.158	5.36	(20, 571)	.001	1.00
GROUP x		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
GRADE					
Wilks Lambda	.869	1.02	(80, 2254)	.437	.998
Pillai's trace	.137	1.02	(80, 2296)	.443	.998
GROUP x					
GENDER					
Wilks Lambda	.907	.942	(60, 1704)	.602	.983
Pillai's trace	.095	.941	(60, 1719)	.605	.983
GRADE x					
GENDER					
Wilks Lambda	.905	1.46	(40, 1142)	.035	.996
Pillai's trace	.097	1.45	(40, 1144)	.036	.996
GROUP x					
GRADE x					
GENDER					
Wilks Lambda	.903	.738	(80, 2254)	.960	.974
Pillai's trace	.100	.738	(80, 2296)	960	.974

SPSS MANOVA was used for the analysis with the Type III sequential adjustment for nonorthogonality. It is important to note that the Box's M statistic is significant (p<.001) thus rejecting the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups. Although this is an indication of a violation of the assumption of equality across groups, it has been argued that the Box's M test is overly sensitive, and that the results of the MANOVA are valid in light of the high observed power coefficients (Stevens, 1996; Tabachnick & Fidell, 1996). In the case of a significant Box's M statistic, Tabachnick and Fidell (1996) suggest using the more conservative Pillai's criterion to evaluate multivariate significance in the situation of unequal N's, and these are presented in Table 4.

There were no significant Group x Gender or Group x Grade interaction effects, thus allowing for comparisons of the four classification groups without the need to control for either gender or grade. The three-way interaction of Group x Grade x Gender was also not found to be significant.

Personality Variables

Group Differences on the High School Personality Questionnaire (HSPO) Factors

The means and standard deviations for the 14 personality factors of the HSPQ, as well as the results of the univariate analyses are presented in Table 5. The normative mean score for each of the HSPQ factors is 5.5, with a standard deviation of 1.00. Therefore, any score below 4.5 or above 6.5 is considered to deviate from the norm (Cattell et al., 1984).

The results indicate that significant differences exist between the four groups on 10 of the 14 personality factors: Intelligence, Emotional Stability, Excitability, Cheerfulness, Conformity, Sensitivity, Apprehension, Self-Sufficiency, Self-Discipline and Tension. Post hoc Scheffe pairwise comparisons for these factors are presented:

Factor B: Intelligence

Post-hoc tests revealed that non-gamblers scored significantly higher on levels of abstract thinking than the regular (Gp 3) and problem gamblers (Gp 4). The mean scores show a linear decrease from Group 1 to Group 4, with no differences between regular and problem gamblers.

Factor C: Emotional Stability

Groups 1, 2, and 3 differ significantly from Group 4, with the problem and pathological gamblers showing the lowest levels of emotional stability. Although scores in

Group 4 are lower than those in the other groups, their score falls within the normative range. Individuals in Groups 1 and 3 are apparently higher than the norm on this trait.

TABLE 5

HSPQ	Group	Group	Group	Group	Univariate <u>F</u>
Factor	1	2	3	4	(3, 764)
Warmth	M= 5.95	M= 5.96	M= 6.17	M= 6.00	1.26
	SD= 2.33	SD= 2.33	SD= 2.49	SD= 2.30	
Intelligence	M= 6.00	M= 5.61	M=5.41	M= 4.98	7.03**
	SD= 1.89	SD= 1.82	SD=1.85	SD= 1.96	
Emotional	M= 6.52	M= 6.37	M=6.75	M= 5.63	3.99*
Stability .	SD= 2.19	SD= 1.90	SD=1.79	SD= 2.02	
Excitability	M= 4.99	M= 5.47	M=5.52	M= 6.86	10.94**
	SD= 2.14	SD= 1.83	SD=1.89	SD= 1.85	
Dominance	M= 6.32	M= 6.60	M=6.65	M= 6.31	.586
	SD= 1.90	SD= 1.92	SD=2.01	SD= 1.99	
Cheerfulness	M= 4.95	M= 5.72	M= 6.17	M= 7.17	13.05**
	SD= 2.14	SD= 2.13	SD=2.12	SD= 2.12	
Conformity .	M= 6.48	M= 5.77	M=5.30	M=4.33	14.64**
	SD= 2.04	SD= 2.27	SD= 2.16	SD= 2.12	
Boldness	M= 5.75	M= 5.87	M= 6.15	M= 6.09	2.01
	SD= 2.18	SD= 2.03	SD= 1.93	SD= 1.79	
Sensitivity	M= 6.04	M= 5.21	M=5.04	M= 4.98	11.31**
	SD= 2.12	SD= 2.02	SD= 1.80	SD= 2.04	
Withdrawal	M= 6.09	M= 5.95	M=5.67	M= 5.78	1.15
	SD= 2.19	SD= 1.91	SD=1.64	SD= 1.73	
Apprehension	M= 4.68	M= 5.02	M= 4.54	M= 5.56	4.36*
	SD= 2.27	SD= 2.09	SD=1.83	SD= 1.75	
Self-Sufficiency	M= 6.14	M= 5.79	M=5.53	M= 5.25	4.47*
•	SD= 1.98	SD= 1.77	SD=1.62	SD= 1.78	
Self-Discipline	M= 6.10	M= 5.47	M=5.24	M= 4.30	7.03**
-	SD= 2.20	SD= 2.06	SD= 2.02	SD= 2.35	
Tension	M= 5.03	M= 5.31	M=5.09	M= 6.23	4.14*
	SD= 1.90	SD= 2.00	SD=1.98	SD= 1.77	

Personality factors as a function of severity of gambling behavior

* indicates p<.01

** indicates p<.001

Factor D: Excitability

Groups 1, 2, and 3 differed significantly from Group 4 with the problem and pathological gamblers being more excitability than those in the other groups. Furthermore, individuals in Group 4 scored significantly higher than the normative mean on this trait.

Factor F: Cheerfulness

A linear increasing trend is clearly evident from Groups 1 to 4. The problem and pathological gamblers (Gp 4) differ significantly from the other groups, as well as deviate from the normative mean, indicating that they are more outgoing than their peers. Occasional (Gp 2) and regular (Gp 3) gamblers do not differ on this trait.

Factor G: Conformity

A decreasing trend is evident from Group 1 to Group 4. Post-hoc comparisons indicate that all groups differ significantly from each other, with the exception of the occasional (Gp 2) and regular (Gp 3) gamblers who do not differ on this trait. The problem and pathological gamblers (Gp 4) deviate from the normative mean, indicating minimal conformity to moral group standards.

Factor I: Sensitivity

The mean scores reflect a decreasing trend from Group 1 to 4. The non-gamblers differ significantly from all the other groups. Therefore, those who abstain from gambling appear to be more sensitive than those who gamble, regardless of the degree of gambling involvement. All groups fell within the normative range.

Factor O: Apprehension

Problem and pathological gamblers yielded the highest mean scores. However, they lie within the normal range. Post-hoc comparisons indicate that regular gamblers (Gp 3) differ significantly from problem and pathological gamblers (Gp 4) on this trait. *Factor Q₂: Self-Sufficiency*

Non-gamblers differ from regular and problem and pathological gamblers on this trait (Gp1 vs. Gps 3 & 4). Thus, adolescents in this sample who abstain from gambling tend to be more self-sufficient than those gambling regularly.

Factor Q_3 : Self-Discipline

A linear decrease in self-discipline is noted from Gp 1 to 4. The groups differ significantly from each other, with the exception of the occasional (Gp 2) and regular (Gp

3) gamblers who do not differ on this trait. Problem/pathological gamblers score significantly lower on this factor than the norm, indicating difficulties with self-discipline. *Factor* Q_4 : *Tension*

The groups differ significantly from each other, with the exception of the occasional (Gp 2) and regular (Gp 3) gamblers who do not differ on this trait. All groups fall within the normative range, with problem and pathological gamblers indicating higher tension than the rest.

Gender Differences on the HSPQ Factors

Several gender differences were evident on the HSPQ although the scaled scores for males and females were obtained from separate normative tables, thus controlling for gender differences in personality traits. Significant univariate gender differences are noted for the following factors: Intelligence, Dominance, Sensitivity, Withdrawal, Apprehension, and Tension (Table 6). No Gender x Group interactions were obtained.

TABLE 6

Univariate results: HSPQ factors demonstrating significant gender differences

HSPQ Factor	Males	Females	<u>F(1,764)</u>	p
Intelligence	M= 5.98 SD= 1.81	M= 5.20 SD= 1.84	22.70	.001
Dominance	M=6.19 SD=1.93	M= 6.87 SD= 1.90	8.83	.003
Sensitivity	M=5.85 SD=1.88	M= 4.78 SD= 2.04	5.29	.001
Withdrawal	M=5.62 SD=1.92	M= 6.19 SD= 1.86	9.71	.002
Apprehension	M=4.67 SD=1.93	M= 5.13 SD= 2.17	8.23	.004
Tension	M= 5.17 SD= 2.06	M= 5.41 SD= 1.89	4.317	.038

Developmental Differences on the HSPO Factors

The only HSPQ factor which showed a significant effect for grade is Factor B (Intelligence), with older students showing higher levels of abstract thinking (\underline{F} (2, 764) = 3.31, \underline{p} <.037). No Group by Grade interactions were noted.

Sensation Seeking

Both the Sensation Seeking Scale (Form V) (SSS) and the Arnett Inventory of Sensation Seeking (AISS) were used as measures of risk-taking and sensation seeking given the different theoretical constructs underlying each of the scales.

Group Differences on the SSS

The means and standard deviations for the SSS, as well as the univariate results of the SSS subscales are reported in Table 7. A main effect for Group is noted for the Boredom Susceptibility, Disinhibition, and Experience Seeking Subscales of the SSS. The total SSS could not be included in the MANOVA, therefore a separate ANOVA was performed on this variable, with Group as the independent factor. The one-way ANOVA reveals a significant difference between the four groups. Risk-taking increases linearly with degree of gambling involvement, and this increase is most noted for the Disinhibition and Boredom Susceptibility subscales.

TABLE 7

В	S*	DI	S*	E	S*	TA	7*	SSS T	`otal**
M	SD	М	SD	М	SD	M	SD	_M	SD
3.22	2.17	2.53	2.27	3.79	2.05	5.39	2.66	14.97	6.48
3.75	2.15	3.61	2.60	4.38	2.10	5.62	2.76	17.41	6.43
4.13	2.26	4.73	2.82	4.33	1.82	5.89	2.79	19.12	6.97
5.40	2.09	6.51	2.37	4.72	1.98	6.42	2.58	23.05	5.83
6.0	69	27	.41	6.	35	.5	71	26	.86
p<.(001	<u>р</u> <.(001	p<.(001	<u>p</u> <.0	534	<u>р</u> <.	001
	B <u>M</u> 3.22 3.75 4.13 5.40 6.0 p<.0	BS* <u>M SD</u> 3.22 2.17 3.75 2.15 4.13 2.26 5.40 2.09 6.69 p<.001	BS* DI M SD M 3.22 2.17 2.53 3.75 2.15 3.61 4.13 2.26 4.73 5.40 2.09 6.51 6.69 27 p<.001	BS* DIS* M SD M SD 3.22 2.17 2.53 2.27 3.75 2.15 3.61 2.60 4.13 2.26 4.73 2.82 5.40 2.09 6.51 2.37 6.69 27.41 p<.001	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

A comparison of the four groups on the Sensation Seeking Scale

* score range 0 - 10, ** score range 0 - 40

Post-hoc Scheffe pairwise comparisons indicate that all 4 groups are differentiated by the Disinhibition subscale. The occasional and regular gamblers do not differ on the Boredom Susceptibility subscale, and the non-gamblers differ from the occasional and problem and pathological gamblers on the Experience Seeking subscale. No significant Group x Grade or Group x Gender interactions were found for the SSS.

Arnett Inventory of Sensation Seeking (AISS)

The means and standard deviations, as well as the univariate results from the MANOVA for the AISS subscales are presented in Table 8. A main effect for Group is noted for the Intensity subscale of the AISS, but not for the Novelty subscale. A one-way ANOVA performed on the total AISS score was also found to be significant. Post hoc Scheffe analyses indicate that groups 3 and 4 do not differ on the total AISS scale, whereas the remaining pairwise comparisons do differ significantly. Only on the Intensity subscale did all four groups differ significantly from one another.

TABLE 8

Total AISS** Novelty* Intensity* М SD М SD М SD 26.43 4.25 50.47 6.78 Group 1 4.04 24.06 3.85 53.38 6.75 Group 2 27.16 26.21 4.29 7.75 28.24 27.75 4.53 4.76 56.01 Group 3 5.07 7.52 27.68 4.08 30.29 57.97 Group 4 1.50 25.60 25.49 Univariate F p<.214 p<.001 p<.001 (3, 764)

A comparison of the four groups on the Arnett Inventory of Sensation Seeking

* score range 10 - 40 ** score range 20 - 80

The Grade x Group interaction is significant for both the Intensity (<u>F</u> (6, 816)= 2.97, p<.007) and Novelty (<u>F</u> (6, 816)= 2.73, p<.013) subscales, with individuals in grade 7 showing the greatest increases in risk-taking with degree of gambling involvement. No Group x Gender interaction was noted for the AISS.

The relationship between the SSS and the AISS

The above results suggest that the SSS Disinhibition, Boredom Susceptibility and the AISS Intensity subscales are the measures which best represent the *type* of risk-taking involved in gambling. A Pearson correlation matrix 72

was computed to examine the relationship between the subscales of the SSS and AISS as well as their relationship to the grouping categorization. The correlation matrix is presented in Table 9. The correlations indicate that the Disinhibition (SSS) and the Intensity (AISS) subscales are strongly correlated with one another (\underline{r} =.518), suggesting they may in fact be tapping into a similar concept of sensation seeking. Furthermore, the Disinhibition and Intensity subscales show the strongest correlations with the degree of gambling involvement (Group), as compared to the other SSS and AISS subscales.

TABLE 9

Correlation matrix including degree of gambling involvement

	GROUP	SSS.BS	SSS.DIS	SSS.ES	SSS.TA	AISS.INT	AISS.NOV
GROLP	1.00						
SSS.BS	.231**	1.00					
SSS.DIS	.376**	.457**	1.00				
SSS.ES	.106**	.201**	.420**	1.00			
SSS.TA	.095**	.172**	.259**	.368**	1.00		
AISS.INT	.364**	.287**	.518**	.303**	.455**	1.00	
AISS.NOV	.102**	.208**	.298**	.471**	.419**	.375**	1.00

and sensation seeking measures

** Indicates correlation is significant at the p<.01 level (2-tailed).

Developmental Differences on the Sensation-Seeking Measures

A main effect for grade was obtained for the SSS Disinhibition (\underline{F} (2, 814)= 7.88, \underline{p} <.001) and Experience Seeking (\underline{F} (2, 814)= 10.645, \underline{p} <.001) measures, but not for any of the AISS subscales. The risk-taking scores increase with age, with grade 11 students

obtaining the highest means. The means and standard deviations for the Disinhibition subscale are as follows: Grade 7 (M= 2.86, SD= 2.62), Grade 9 (M= 4.00, SD= 2.58), and Grade 11 (M= 4.81, SD= 2.86). The means and standard deviations for the Experience Seeking subscale are: Grade 7 (M= 3.57, SD= 1.82), Grade 9 (M=4.31, SD= 1.94), and Grade 11 (M= 5.03, SD= 2.14).

Gender Differences on the Risk-Taking Measures

A main effect for gender was found for all SSS subscales with the exception of the Boredom Susceptibility subscale, and the Intensity subscale of the AISS. Males obtained higher levels of risk-taking with respect to Disinhibition, Thrill and Adventure Seeking, and Intensity whereas females showed higher levels of risk-taking with respect to Experience Seeking (Table 10).

TABLE 10

	Males	Females	Univariate <u>F(1, 764)</u>	<u>p</u>
SSS. BS	M= 3.97 SD= 2.25	M= 3.74 SD= 2.21	2.09	149
SSS.DIS	M= 4.34 SD= 2.81	M= 3.36 SD= 2.65	6.38	.012
SSS.ES	M=3.91 SD= 1.92	M= 4.66 SD= 2.09	21.77	.001
SSS.T A	M= 5.98 SD= 2.75	M= 5.40 SD= 2.71	4.83	.028
AISS. Nov	M= 27.26 SD= 4.05	M= 27.10 SD= 4.11	.033	.856
AISS. Int	M= 27.63 SD= 4.98	M= 25.43 SD= 4.27	11.73	.001

Gender differences on the SSS and AISS

Discussion

This represents the first known study examining personality correlates of gambling behavior amongst adolescents. Of particular importance was the methodological approach employing a comparison of adolescents based upon level of gambling involvement. This approach has been infrequently applied and represents a point of interest among researchers in this domain (Walker, 1992). The results support the classification system employed, with the four groups being differentiated by several of the risk-taking and personality traits. The use of the four categories allows for greater generalization of results and facilitates our understanding of the psychology of adolescent gambling behavior. This methodological paradigm is in contrast to those methodologies that only incorporate adult pathological gamblers who have entered treatment and are at the 'end' of their gambling careers.

Are there distinguishing characteristics that predispose individuals to addiction? There appear to be specific personality traits which may play such a role. Problem and pathological adolescent gamblers were found to differ from the rest of the sample on 10 of the 14 personality factors, differing from the normative mean on four of those traits. More specifically, adolescent problem and pathological gamblers deviated from the *norm* on measures of impulsivity, distractibility, over-activity, self-indulgence, and tend not to conform to group standards. Furthermore, they appear, in general, to exhibit less selfdiscipline than others, and have a carefree, outgoing nature about them. Research using adult pathological gamblers yielded similar findings with regard to low conformity (Taber, Russo, Adkins, & McCormick, 1986) and high impulsivity (Zimmerman, Meeland, & Krug, 1985).

Several researchers (e.g., Bland et al., 1993; Chen et al., 1993) have characterized adult pathological gamblers as having characteristics of an antisocial personality disorder. The character traits of the problem and pathological gamblers which deviate from the norm in the current study are similar to those found in samples of institutionalized delinquents (Cattell et al., 1984 pp.49), namely for the Excitability, Self-Discipline, and Conformity factors.

As compared to non-problem gamblers, problem and pathological adolescent gamblers are more self-blaming, guilt-prone, anxious, and less emotionally stable. Adolescents with problematic and pathological gambling involvement also show higher risk-taking tendencies. Similar to the findings of Kuley and Jacobs (1988) with adults, the problem and pathological adolescent gamblers in our sample obtained significantly higher scores on Zuckerman's Sensation Seeking Scale than social gamblers, namely on the Disinhibition, Boredom Susceptibility, and Experience Seeking subscales. The Thrill and Adventure Seeking subscale did not distinguish pathological gamblers from social gamblers, nor did it differentiate our adolescents in the four groups. Our findings suggest that the adolescent problem and pathological gamblers are not as inclined to engage in high-risk sports activities as they are to being socially and sexually disinhibited (i.e., drinking, partying), easily bored with routine and repetition, and seekers of non-conventional lifestyles. With respect to the Arnett Inventory of Sensation Seeking, the problem and pathological adolescents on the Intensity subscale but not on the Novelty subscale. It appears as though degree of gambling involvement is directly related to certain *types* of risk-taking behavior even amongst a population (adolescents) at their peak for risk-taking behavior.

The Disinhibition (SSS) and Intensity (AISS) subscales appear to be the most useful measures of risk-taking for adolescent gamblers, and there is reason to suspect that these two subscales are measuring similar risk-taking traits. Similar results were found with young adults (Derevensky & Gupta, 1996; Powell, Hardoon, Baboushkin, & Derevensky, 1997). The AISS is a shorter scale to administer than the SSS (Form V), and is free of certain limitations which constrain the SSS, such as outdated expressions, forced choice questions, and confounding questions (see Arnett, 1994 for a more thorough discussion). The AISS seems to be an appropriate scale to use with adolescent gamblers, with the Intensity subscale being of primary interest.

There is sufficient evidence to suggest that problem and pathological gamblers have different levels of physiological arousal in their resting state. The psychological literature links high sensation seeking tendencies to Eysenck's Extroversion personality dimension (Farley & Farley, 1970), and this dimension is stated to be the behavioral expression of low cortical arousal (Eysenck, 1967), such that these individuals seek stimulation in their environments in an attempt to correct their low cortical activity (Quay, 1965). Furthermore, Zuckerman's Sensation Seeking Scale is believed to be an operational measure of one's *optimal levels of arousal*, and it is also stipulated that genetic factors are involved in the establishment of individual differences in sensation seeking (Eysenck, 1981). Peck (1986) characterized pathological gamblers as individuals with high energy levels who like stimulating situations. It follows that problem gamblers may seek the stimulating gambling activities to increase/correct their genetically determined low levels of physiological arousal. If this were found to be true, it would provide partial support for Jacobs' (1986) General Theory of Addictions given that an abnormal physiological resting state is one of the two prerequisites to the development of an addiction.

The implications of these results are widespread, implying that children experiencing Attention Deficit Hyperactivity Disorder (ADHD) may likely be at increased risk for the development of gambling problems, considering their abnormal physiological levels of arousal. A few studies have investigated the potential link between pathological gambling and ADHD (Carlton & Manowitz, 1987; Carlton, Manowitz, McBride, Nora, Swartzburg, & Goldstein, 1987; Goldstein, Manowitz, Nora, Swartzburg, & Carlton, 1985), with findings which indicate that male pathological gamblers share similar EEG characteristics as ADHD children, and rate themselves higher than controls on questionnaires assessing childhood ADHD. The adolescent problem and pathological gamblers scored higher than the norm on the Excitability HSPQ factor, these individuals sharing similar traits with ADHD children (e.g., distractibility, over activity, and impulsiveness).

Despite our current findings, there exists a lack of consensus in the literature for the premise that gamblers suffer from hypotonic resting states. For example, Dickerson and Adcock (1987) conducted a study comparing the heart rates of high and low frequency slot machine players and found no baseline differences. However, these researchers may be

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making the false assumption that a low physiological resting state is reflected in an individual's heart rate. Low cortical arousal is more likely reflected in the electrical activity of the brain rather than heart-rate. The adolescents in the current study who gamble excessively indicate behavioral manifestations that one would expect from individuals suffering from low cortical arousal, such as high sensation seeking and excitable behavior. However, such conclusions are tenuous and are better addressed by direct measures of brain functioning, such as EEG and brain imaging. Nonetheless, for purposes of being able to identify children and adolescents who may be at heightened risk for the development of problematic gambling, the information obtained about the behavioral observable traits of teenagers who gamble excessively are of considerable usefulness. It may be that youth and adults who tend to be impulsive, overly active, and prefer stimulating environments and activities will be more likely to enjoy, and seek, gambling activities. These traits may explain the common interest in video games and gambling found in children and adolescents (Gupta & Derevensky, 1996)

While several personality differences were found, many questions remain unanswered. Are differences in preferred gambling activity associated with these different factors? If so, for which individuals? Are the personality structures found with the problem and pathological adolescent gamblers similar for other addictions? Despite the need to establish prevalence rates, to understand the distorted cognitive processes of gamblers, and the necessity to develop effective screening instruments, researchers must join clinicians in investigating the anecdotal evidence provided by gamblers about themselves. Research into the cognitions, personalities, and biological predispositions of pathological gamblers, especially young gamblers, will help to provide information that ultimately will aid our understanding of why certain individuals develop an addictive dependence to gambling whereas others can enjoy an occasional evening of gambling without ever feeling the 'pull' to put gambling ahead of all else.

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STUDY III

An empirical examination of Jacobs' General Theory of Addictions:

Do adolescent gamblers fit the theory?

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Abstract

The present study examines 817 adolescent high school students' gambling behavior. Participants completed the DSM-IV-J, a gambling screen examining severity of gambling problems along with the High School Personality Questionnaire (HSPQ), the Reynolds Adolescent Depression Scale (RADS) and a questionnaire devised by the authors inquiring about gambling behavior, substance abuse, alcohol consumption, and cigarette smoking. The study seeks to test the Jacobs' (1986) General Theory of Addictions, using problem and pathological adolescent gamblers as the *prototype* to test the model. The results obtained through path analysis and logistic regression suggest that Jacobs' theory is a plausible and likely explanation for the development of a gambling addiction amongst adolescents. The clinical implications are addressed.

Review of the literature

It is likely- at least in the short term- that the conceptual future of the compulsive gambling field will be shaped in part by the important concepts drawn from the better known addictions. After all, we now view compulsive gambling- for better or worse- as an addictive behavior. It is very important, then, that we understandand hopefully learn from- the conceptual problems of the other addictions. (Shaffer, 1989, pp. 7-8).

Gambling has proven to be a very popular pastime among youth (e.g., Gupta & Derevensky, 1996, Jacobs, 1989; in press; Stinchfield, Cassuto, Winters, & Latimer, 1997; Wynne, Smith, & Jacobs, 1996). Being known as a gambler (or risk-taker) leads to social recognition and subsequently to a higher status amongst friends (Smith & Abt, 1984). Fisher (1993) and Griffiths (1991) have painstakingly studied the social milieu of arcades in England where adolescents play the fruit machines, and have identified a social hierarchy ranging from the most to the least respected, based upon playing performance. Most youth participate in gambling activities without serious consequences or the development of a dependency, yet some feel the need to gamble excessively, assigning it priority above all else. The need to understand what differentiates this small subset of individuals is what feeds addiction theorists and fuels research such as the current study. To date, there remains a lack of empirical research investigating the relationship between personality factors and degree of gambling among adolescents.

Although gambling behavior can be traced back for centuries, it was not until the past decade that it has come to be viewed as an addictive behavior similar to other addictions. In 1983, Levinson, Gerstein and Maloff conducted a series of meta-analyses in an attempt to uncover psychological, sociological, and biological commonalties amongst the different disorders of addiction. Although they were unable to provide sufficient empirical support, they concluded that regularities across addictions were evident. Blaszczynski, Buhrich, and McConaghy's (1985) examined personality variables among

heroin addicts and pathological gamblers, and concluded that gambling, like heroin dependency, is an addictive disorder. Carlton and Goldstein (1987), examined physiological correlates of pathological gambling and concluded that these factors are a necessary and integral part of any formulation or theory of pathological gambling, not unlike the theories and research concerning alcohol and drug dependency. In addition, numerous investigators report multiple comorbid addictions amongst addicts, suggesting they all fulfill a similar need (Lesieur, Blume, & Zoppa, 1986). Withdrawal symptoms, which are common to all addictions, were also experienced by up to 50% of Gamblers Anonymous members when they stopped their gambling (Wray & Dickerson, 1981).

Jacobs (1989) defines an addiction as "a dependent state acquired over time by a predisposed person in an attempt to relieve a chronic stress condition" (p. 35). In this definition, only certain individuals can fall victim to an addiction, and the chosen addiction provides relief from a stressed state. But what predisposes a person to addiction? Jacobs postulates several basic premises. Firstly, he contends that two sets of interdependent, predisposing factors must be present for an individual to be at risk for developing and maintaining an addictive behavior, one being an abnormal physiological resting state that is chronically either excessively excited or hypotensive, and the other being a psychological nature characterized by feelings of inferiority, rejection, inadequacy, and/or guilt stemming from childhood, and low self-esteem. Accordingly, "... both sets of predisposing factors must coexist and exercise their respective effects before an individual will maintain an addictive pattern of behavior *in a conducive environment*" (Jacobs, 1989, p. 39).

A physiological condition of either being chronically hyper or hypo-aroused is believed to be stress-inducing. Individuals suffering from either of these extreme arousal levels are motivated to seek activities or substances that correct the altered resting state with the goal of obtaining a more comfortable homeostatic state. It remains plausible that a person with a hypotensive physiological arousal level may find relief in a stimulating and exciting activity such as gambling, temporarily eliminating their boredom and possible 86

depression. It follows that such individuals would likely have a greater propensity for risktaking and sensation-seeking than the norm. In contrast, a person with a hypertensive arousal state would likely find more relief in alcohol or marijuana, two substances known for their depressant effects. In both these examples, gambling and substances serve to regulate and "normalize" physiological resting states. Impressive support of this theory was obtained by Martinez-Pina et al. (1991) who found that pathological adult gamblers reported feelings of inferiority and rejection in their childhood, reported experiencing dissociative states when engaged in gambling, and showed a higher prevalence of depression than controls.

In Jacobs' general addictions theory, an addictive preoccupation, such as gambling, enables the individual to find escape from painful realities and further fosters the sense of being a highly successful and admired individual who, at the time of indulgence, feels invincible. Dissociative states are common to all forms of addiction and permit the individual to escape into denial and bliss from psychological distress. This "altered state of identity" is believed to be the common goal of all addictive patterns of behavior, is extremely rewarding, reinforcing, and is believed to play an instrumental role in the maintenance of the addiction. More specifically, Jacobs views addictive behaviors as a form of self-treatment, considering they permit escape from, and momentarily correct, a chronic stress condition. This "immediate gratification" of both a psychological and physical nature, whether it is obtained from gambling, drinking, shopping or overeating, is believed to perpetuate the addiction (Jacobs, 1989). Convergent evidence reveals that excitement and escape from daily stressors were the primary motives for gambling, providing support for Jacobs' theory (Kallick et al., 1979; Kulley & Jacobs, 1988).

Still further, Jacobs postulated that a conducive environment is necessary, and must accompany the coexisting predisposing factors in the development of an addictive behavior pattern. As such, it is likely that the individual will happen upon an activity by chance (such as gambling, overeating, or drug consumption) that will serve to regulate their 87

abnormal physiological resting state and alleviate psychological distress. This "chance triggering event" must present the individual with sufficient intensity and novelty in order to motivate him/her to actively pursue a similar activity in the future.

Not all individuals remain at risk of developing an addictive pattern of behavior. Rather, Jacobs suggests that only those individuals with chronically aroused or depressed physiological levels of arousal, who also suffer from feelings of rejection and inferiority, are at greatest risk for the development of an addiction. Jacobs cautions that adolescence is a time of heightened vulnerability due to the numerous psychological stressors and physiological changes characteristic of this developmental period.

Depression is often present in pathological gamblers. Clinical depression may be an expression of a hypotensive physiological resting state, and/or it may also be an expression of overwhelming stress that one is incapable of coping with effectively. An investigation of pathological gambler inpatients found that 76% were diagnosed with major depressive disorder, 38% with hypomanic disorder (26% meeting the criteria for both disorders), and 8% with manic depressive disorder (McCormick, Russo, Ramirez, & Taber, 1984). More recent studies have concluded similar results (Blaszczynski, McConaghy, & Frankova, 1991; 1990; Blaszczynski & McConaghy, 1989; Lesieur & Blume, 1990; Linden, Pope, & Jonas, 1986; McCormick, 1993; Ramirez, McCormick, & Lowy, 1988; Raviv, 1993; Torne & Konstanty, 1992). In a national survey of 500 Gamblers Anonymous members, Frank, Lester, and Wexler (1991) found that 48% had contemplated suicide and 13% reported having actually attempted to end their lives. One must be cautious when assigning a causal relationship linking compulsive gambling with depression. It is possible that the depression fosters the addiction, or it could be that gambling itself has led these individuals into a depressive state due to accompanying substantial financial and social losses. According to Jacobs' theory, depression would likely precede the addiction, since gambling is perceived as the solution to unpleasant states of existence. Depression, characterized by hypotonic arousal and negative emotional

states, accounts for two prerequisites of Jacobs' theory. Gambling is conceptualized as the activity that provides the lacking stimulation, bringing upon dissociative states, and therefore, escape from emotional pain. In such cases, problem and pathological gambling may likely serve as antidepressants (Raviv, 1993). There exist many forms of addictive behaviors, but the contention is that they are similar in that they all fulfill a similar need to *escape reality*.

Not unlike depression, personality characteristics are believed to be genetically influenced to a significant degree, and researchers are including biological differences in their theories of personality (e.g., Eysenck, 1967; Gray, 1973, Kagan, 1996). Eysenck (1967) proposed that two extremes of arousal distinguish the Extroversion (E) and Neurosis (N) dimensions of his personality theory. He proposed that the biological basis of Neurosis originates from the sensitivity of the limbic-autonomic system that tends to be highly reactive to environmental and psychological stimuli. These individuals are typically easily startled and agitated. In contrast, he proposed that the biological basis of Extroversion is more closely related to the level of arousal in the neocortex, as modulated by the ascending reticular activating system, with individuals high on the E dimension having a low level of cortical arousal. Such individuals are not as reactive to stimuli and require larger amounts of stimulation to maintain an optimal level of cortical arousal, thus resulting in their extroverted social behavior. Hebb (1955) was among the first psychologists to advocate physiological underpinnings of behavioral psychology, and developed an optimum level of stimulation theory. In his theory, arousal is the physiological basis of behavioral drive. He states that at low level of arousal, an increase in arousal is rewarding and pleasurable, and at much higher initial levels of arousal, a decrease is rewarding. Similar views were expressed by Duffy (1957) 40 years ago who suggested that individuals may differ in arousal, for either genetic and/or environmental reasons, and such differences affect a person's disposition. She was a strong believer that the goal of an optimal level of arousal is likely the basis for sensation-seeking-type

behavior. Fiske and Maddi (1961) similarly expressed that there are likely individual differences in the preferred levels of stimulation, with behavior being strongly motivated by the desire to achieve an optimal arousal state.

Gambling is often referred to as a form of risk-taking or sensation seeking behavior. Zuckerman (1979) proposes a number of interesting links between biological processes and the personality construct of sensation seeking, and believes sensation seeking to be a global trait, defining it as "the need for varied, novel and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences". Sensation seeking appears to be correlated with the Eysenck E dimension, especially the impulsivity factor of the E dimension (Farley & Farley, 1970). Zuckerman's (1994) findings suggest that individuals with higher sensation seeking needs more frequently engage in gambling activities and are more likely to engage in high-risk activities such as drinking and reckless driving. Pathological gamblers are known to be high sensation seekers, scoring significantly higher than social gamblers on the Disinhibition, Boredom Susceptibility, and Experience Seeking subscales of Zuckerman's Sensation Seeking Scale (Dickerson, Hinchy, & Fabre, 1987; Study II). The application of sensation seeking behavior is believed to be an attempt to correct low cortical activity (Quay, 1965). Other researchers have found that high sensation-seeking males exhibit a stronger orienting response than normals to novel stimuli, as indicated by changes in electrodermal skin conductance (Feij, Orleberke, Gazendam, & van Zuilen, 1985; Neary & Zuckerman, 1976), and heart-rate (Orleberke & Feij, 1979; Ridgeway & Hare, 1981), lending support to Jacobs' General Theory of Addictions, with respect to his premise that problem and pathological gamblers have abnormally depressed arousal levels and orient themselves toward activities which compensate for the lacking stimulation. Meyer (1987) maintains a similar view and stipulates that the primary goal of addicts is an immediate change in their emotional state toward a state of well-being, where the outside world is completely "turned off", and further elaborates that gambling serves as a "release

mechanism" resulting in an increase in levels of physiological arousal. Similarly, using a Boredom Proneness scale and the Beck Depression Inventory, pathological gamblers were characterized by tendencies toward boredom and depression (Blaszczynski, McConaghy, & Frankova, 1990), with gambling providing temporary relief from both.

Research in other areas of addictive behavior provide support for a general theory of addictions. If a general theory is warranted, the findings from all areas of addiction research are pertinent to furthering the understanding of the development of gambling addiction. The fact that multiple addictions are common amongst adult pathological gamblers suggests a link across addictive disorders. "Alcoholism and drug abuse and pathological gambling have commonalties. All involve states of arousal which heighten or depress one's state of awareness" (Lesieur, Blume & Zoppa, 1986). Recently, adolescent problem gamblers were found to be more likely to smoke, drink heavily, and consume illicit drugs (Study I; Wynne, et al., 1996). These results support further inquiry into a possible common neurological pathway for addictive disorders and common personal characteristics which may typify an "addictive personality". Studies that have been successful in identifying associated risk factors which may contribute to the development of addictive behaviors provide valuable information, and there appears to be a growing understanding that there exist predisposing characteristics which place individuals at heightened risk for addiction problems. Sharma (1995) examined the relationship between drug dependence and personality traits among 140 adolescents. The author concluded that the addictive personality precedes addiction, and that addiction itself does not create the addictive personality. A study of 76 adolescents in treatment for chemical dependencies found that more than half of the sample were multiply addicted, showing compulsive behaviors with food, sex, relationships, and gambling (Griffin-Shelley, Sandler, & Lees, 1992). In Study I, it was observed that as the severity of gambling involvement increased, so did participation in other addictive behaviors.

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Addictions research has identified several at-risk characteristics. Adolescent alcohol and drug abuse was associated with low self-esteem, psychological distress, learning difficulties, anxiety, impulsiveness, antisocial behavior, suicide attempts, and a history of abuse (Cookson, 1994; Harrison & Hoffman, 1989; Harrison & Luxenberg, 1995). The onset of cigarette smoking was found to be associated with alcohol use, risk-taking, and low self-esteem (Simon, Sussman, & Dent, 1995).

The present study seeks to empirically test Jacobs' theory, incorporating measures selected to assess the two predisposing factors (abnormal physiological resting state, and psychological distress) and the need to "escape". It is expected that problem and pathological gamblers will demonstrate abnormal physiological resting states, have a lower self-concept, obtain higher depression scores, show tendencies towards being guilt-prone and insecure, and report an unhappy childhood, and will report greater levels of dissociation while gambling. Further, they will be more likely to indicate that they gamble for reasons of escape and to alleviate depression, reflecting an increased skill (Jacobs contends that this is a learned adaptive mechanism) in "escaping" from a chronic state of stress. The problem and pathological gamblers are expected to reflect higher rates of comorbidity with regular alcohol and substance use. The importance of assessing the validity of this model for adolescents lies in its potential clinical and educational implications.

Methodology

Participants

Participants included 817 adolescents (417 males and 400 females) from grades 7, 9, and 11, with an age range spanning from 12 years to 17 years. Approval was obtained from three school boards, and five high schools within these boards volunteered to participate. The schools sampled were from middle class communities in the Greater

Montreal region, and the adolescents were predominately Caucasian. The distribution of the sample with respect to grade and gender is outlined in Table 1.

Table 1

Sample distribution by gender and grade

Grade	Males	Females	Total
7	117	141	258
9	190	146	336
11	110	113	223
Total	417	400	817

Instruments

DSM IV-J (Fisher, 1992) (Appendix A): This 12 item instrument is a screen for pathological gambling during adolescence, modeled after the DSM-IV (APA, 1994) criteria for diagnosis of adult pathological gambling. Each item endorsed is given a score of 1, with a score of 4 or greater being the scoring criteria for pathological gambling. Fisher concluded, with her population of young fruit machine players, that the DSM-IV-J is as an effective discriminator of pathological gambling in children and adolescents.

High School Personality Questionnaire (HSPQ) (Catell, Catell, & Johns, 1984): The HSPQ is a character trait inventory often used to diagnose behavior problems during adolescence. It is a self-report instrument focusing on 14 personality traits: warmth, intelligence, emotional stability, excitability, dominance, conformity, boldness, sensitivity, withdrawal, enthusiasm, apprehension, self-sufficiency, self-discipline, and tension. The HSPQ is one of the more widely researched instruments among all psychological tests. Reliability for the HSPQ is .83 for Forms A + B. The HSPQ requires approximately 45 minutes to complete.

The reason for utilizing this measure is to test a portion of Jacobs' theory with the HSPQ personality factors, Excitability (Factor D) and Apprehension (Factor O), which

reflect possible hyper- and hypo- levels of physiological arousal as well as the emotional characteristics of self-doubt and guilt-proneness. Factor D represents a continuum from excitable (D+) to phlegmatic (D-). D+ individuals tend to be impatient, overactive, demanding, impulsive, and easily distracted. These descriptions are not unlike characteristics common to Attention Deficit Hyperactivity Disorder. Factor O represents a continuum ranging from self-assured (O-) to apprehensive (O+). O+ adolescents are self-blaming, guilt-prone, insecure, and tend to worry and be anxious. They are overly sensitive to the approval or disapproval of others, and cry easily. In contrast, those low on this trait tend to be secure, guilt-free, untroubled, and self-satisfied. They are resilient individuals, who do not rely upon the opinions of others. The dependability coefficients for the single personality factors of Excitability and Apprehension are .90, and .91 respectively.

The validation of the HSPQ was accomplished using both construct and criterion validation. The authors report there have been no fewer than 12 replications of its personality structure using factor analytic techniques (Cattell et al., 1984, manual pp. 27-28), all indicating a similar factor structure.

Sensation Seeking Scale-Form V(SSS) (Zuckerman, Eysenck, & Eysenck, 1978): The SSS consists of 40 forced choice items with individuals selecting statements that best describes them. Examples include, "I like wild uninhibited parties", and "I would like to try parachute jumping". The SSS has four subscales, each comprising 10 items; Thrill and Adventure Seeking, Disinhibition, Boredom Susceptibility, and Experience Seeking. The Disinhibition subscale is of primary interest in the present study given that a high score believed to be a reflection of low cortical activity, thus indicating a hypotonic physiological resting state. Internal reliabilities for the total scale have been found to range from .83 to .86.

Gambling Questionnaire (Appendix B): This is a revised version of the questionnaire developed by Gupta and Derevensky (1996). It inquires about gambling

behavior with respect to frequency of play, types of games played, with whom they engage in these activities, their underlying cognitions concerning gambling, and concomitant behaviors such as alcohol and drug consumption, and criminal activity. Included are the Dissociative Scale (Jacobs, 1988), and a measure of arousal developed by Jacobs (personal communication) for the purpose of the present study. The Dissociative Scale is comprised of 5 items, with a range of possible responses from never (0 points) to all the time (3 points). The questions ascertains whether the individual experiences a) loss of time, b) blackouts, c) trance-like states, d) feeling like a different person, and e) an out-of-body feeling while gambling. Possible scores range from 0 to 15 for the overall score. The Arousal scale consists of the following question, "I feel best when..." and is followed by 4 forced choice items, an example being: I am resting (1 point) vs. I am active (2 points). A higher score indicates a preference for a stimulating environment, whereas a lower score reflect a preference for a non-stimulating environment. Possible scores range from 4 to 8 for the overall score. Also included is a question asking the adolescents to rate their level of happiness during their preschool and elementary years, as compared to other children their age, on a 5 point Likert-scale.

Self-Perception Profile for Children (Harter, 1985): The Global Self-Worth subscale was included and measures the extent to which children and adolescents like themselves and feel happy about the way they are leading their life. The total score is sum of the 5 questions, each ranging from 1 point (perceptions of inadequacy) to 4 points (perceptions of adequacy), thus resulting in a minimum total score of 5 and a maximum of score of 20.

Reynolds Adolescent Depression Scale (RADS) (Reynolds, 1987): This scale is a widely used measure of depression amongst adolescents. It consists of 30 items and utilizes a four point Likert-type response format. The adolescent is required to indicate whether the symptom-related item has occurred almost never, hardly ever, sometimes, or most of the time. Items are worded in the present tense to tap into present symptom status.
Responses are weighted from one to four points, so that the total score on the RADS can range from 30 to 120. Reliability coefficients range from .91 to .94.

Procedure

All students who obtained parental permission and were willing to participate were included in the study. The instruments were group administered in their classrooms and/or school gymnasiums and scored according to their respective manuals. Students were provided the directions for each instrument according to the test manual, and were required to work individually. Teachers were not present during the administration of the questionnaires and research assistants were present at all times to answer questions. Students were ensured confidentiality and each was assigned an identification code. Students required approximately 60 minutes to complete the instruments.

Results

A classification system was devised and all participants were grouped into one of four categories, based upon frequency and severity of gambling behavior. Group 1, non-gamblers (N = 163), consists of individuals who reported never gambling during the previous 12 months. Group 2, occasional gamblers (N = 414), includes individuals reported gambling less than once per week and indicate no gambling related problems on the DSM-IV-J (score = 0). Group 3, regular gamblers (N = 175) includes individuals who reported gambling at least once per week and report a maximum of 2 gambling related problems on the DSM-IV-J (score = 1 or 2). Group 4, problem and pathological gamblers (n = 65) consists of individuals who reported gambling at least once per week and report a maximum of three problems related to gambling on the DSM-IV-J. This group includes adolescents who do not quite meet the criteria for pathological gambling as well as those meeting the criteria (4 + problems on the DSM-IV-J). The rationale behind lowering the criteria of the DSM-IV-J by 1 item was to include those who may be in the process of progressing into a diagnosis of pathological gambling as well as those who may be shifting

out of a diagnosis of pathological gambling. It is our opinion that those individuals who approach the criteria for pathological gambling (a score of 3 on the DSM-IV-J) and those who are in the first stages of transgressing out of a diagnosis of pathological gambling (a score of 3 on the DSM-IV-J) share similar characteristics as those clearly meeting the DSM-IV-J criteria. The distribution of the total sample by group composition and gender can be found in Table 2.

TABLE 2

Group	Grade 7	Grade 9	Grade 11	Total (Gender	Total Group
				М	F	
1	54	72	37	78	85	163
2	138	161	115	174	240	414
3	45	72	58	112	63	175
4	21	31	13	53	12	65

Sample distribution among the four groups according to gambling severity

A 4 X 2 X 3 multivariate analysis of variance (MANOVA) was performed, including Group, Gender, and Grade as fixed variables and the RADS, HSPQ, SSS, Harter, and Arousal measures as dependent variables. To ensure accuracy, 52 HSPQ questionnaires were discarded due to suspicious completion (i.e., last question did not indicate that the student had answered the entire measure truthfully), thus reducing the total subject pool to 765 for the MANOVA. Furthermore, the dissociation scale was not included in this analysis since those in Group 1 (non-gamblers) did not respond to the questions as they were not applicable. The results of the MANOVA (Univariate results will be reported in their appropriate section) are presented in Table 3. SPSS MANOVA (Version 7.5) was used for the analysis with the Type III sequential adjustment for nonorthogonality. The Box's M statistic was not significant (p<.666) thus maintaining the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups. There were no significant Group x Gender or Group x Grade interaction effects, thus allowing for comparisons of the four classification groups without needing to control for either gender or grade. The three-way interaction of Group x Grade x Gender was found to be significant, with grade 9 females in Group 4 being the group of adolescents to obtain the highest scores on most of the measures.

TABLE 3

Effect		Value	<u>F</u>	df	Sign.	Observed Power
Group	Wilks Lambda	.861	7.432	(15, 2007.33)	g <.001	1.00
GRADE	Wilks Lambda	.971	2.139	(10, 1454.00)	₽<.019	.912
GENDER	Wilks Lambda	.921	12.458	(5, 727.00)	p <.000	1.00
GROUP* GRADE	Wilks Lambda	.943	1.438	(30, 2910.00)	₽<.058	.940
GROUP* GENDER	Wilks Lambda	.973	1.320	(15, 2007.33)	p<.181	.780
GRADE* GENDER	Wilks Lambda	.984	1.88	(10, 1454.00)	₽<.239	.631
GROUP* GRADE* GENDER	Wilks Lambda	.937	1.60	(30, 2910.00)	p <.021	.965

Results of the MANOVA

Physiological Resting State

The Excitability personality trait (Factor D) of the HSPQ, the Disinhibition subscale of the SSS, and the Arousal scale in the Gambling Questionnaire were used as indirect measures of physiological resting state, and all are shown to increase linearly with degree of gambling involvement. Means and standard deviations are presented in Table 4. The univariate ANOVA results revealed significant differences across the four classification groups for Excitability on the HSPQ (\underline{F} (3, 764)= 10.31, p<.001), Disinhibition subscale of the SSS (\underline{F} (3, 764= 27.02, p<.001), and Arousal (\underline{F} (3, 764)= 4.98, p<.002). Post hoc Scheffe pairwise comparisons indicate that with the exception of occasional and regular gamblers, all groups differed from each other on Factor D (HSPQ), and on the Disinhibition measure. Of importance is that the problem and pathological gamblers exhibited the highest levels of excitability and disinhibition, and differed significantly from the other groups of adolescents. For the Arousal scale, the problem and pathological gamblers in general differed from non-gamblers on this measure.

Emotional Indices

The measures used to assess psychological distress included the RADS, Harter Global Self-Worth Scale, Apprehension personality trait (Factor O) of the HSPQ, and the childhood happiness rating. The means and standard deviations for these measures are displayed in Table 4. The univariate ANOVA results across the four classification groups revealed significant differences across the four groups for the RADS (E(3, 764)=8.23, p<.001), Harter (E(3, 764)=3.27, p<.021), and Apprehension (E(3, 764)=4.16, p<.006), but not for the childhood happiness measure (E(3, 764)=.737, p<.530). The groups did not differ significantly with respect to their rating of childhood happiness, with the problem and pathological gamblers indicating a slightly above average childhood happiness rating. Post hoc Scheffe pairwise comparisons reveal that for the RADS and Apprehension subscale, the problem and pathological group of adolescent gamblers differed from the other three groups, indicating greater depression and apprehension. However, it is important to note that adolescents in Group 4 did not differ significantly from the normative mean on the Apprehension factor. For the Harter Global Self-Concept scale, the non-gamblers and occasional gamblers differ from the problem and pathological gamblers differ from the problem and pathological gamblers differ from the problem and pathological gamblers in factor.

group. Regular and problem gamblers do not differ significantly from each other on the Harter.

The percentages of individuals meeting the criteria for clinical depression (a score of 77 or more on the RADS) was found to be 9.8% for Group 1, 11.8% for Group 2, 10.8% for Group 3, and 23.1% for those in Group 4 (χ^2 (3, 816)= 8.43, p<.038). The significant Group x Gender interaction (\underline{F} (3, 816)= 3.66, p<.012) highlights the finding that females in Group 4 are the individuals with the highest occurrence of depression (58%). However, it is important to note that the males in Group 4 show higher rates of depression (15.1%) than males in Groups 1 (5.1%), 2 (6.9%), and 3 (5.4%).

TABLE 4

Means and standard deviations for measures of predisposing factors

	Group 1	Group 2	Group 3	Group 4
Physiological resting state				
Excitability (HSPQ) [†]	M= 5.01	M= 5.48	M=5.53	M= 6.86
Factor D	SD= 2.14	SD= 1.84	SD= 1.89	SD= 1.86
Disinhibition (SSS)	M= 2.52	M= 3.64	M= 4.67	M=6.52
	SD= 2.23	SD= 2.62	SD= 2.84	SD=2.38
Arousal	M= 4.53	M= 6.82	M= 6.91	M=7.11
	SD= 1.18	SD= 1.17	SD= 1.11	SD=.978
Emotional state				
RADS	M= 58.00	M= 60.51	M=57.93	M=64.98
	SD= 13.95	SD= 13.49	SD=13.42	SD= 13.78
Harter	M= 9.48	M= 10.18	M=10.01	M=11.09
	SD= 3.22	SD= 3.28	SD= 3.18	SD= 3.35
Apprehension (HSPQ)*	M=4.70	M= 5.03	M=4.53	M=5.56
Factor O	SD= 2.28	SD= 2.07	SD= 1.75	SD= 1.75
Childhood happiness	M=3.60	M= 3.54	M=3.54	M=3.42
••	SD= 1.09	SD= 1.44	SD= .99	SD= 1.13

[†]Normative mean = 5.50 (SD=1.00) (Cattell et al., 1984).

Escape from Problems

The non gamblers were not required to complete the dissociative scale since it measured dissociative behaviors while gambling. The total dissociative mean scores for occasional gamblers (M=1.22, SD= 1.90), regular gamblers (M=1.79, SD= 2.06), and

for problem and pathological gamblers (M=4.18, SD= 2.84) differed. A one way analysis of variance (ANOVA) was performed across the three groups of gamblers for each of the items, as well as for the total score, and the results are presented in Table 5. Post hoc Scheffe pairwise comparisons indicate that for all of the dissociation items, as well as for the overall score, the problem and pathological gamblers differed significantly from the regular and occasional gamblers with respect to all items. Percentages of those who reported experiencing any type of dissociation while gambling were also calculated, and are presented by group. These percentages and chi-square results can be found in Table 5 as well. *Losing track of time* and *feeling like a different person* were the most frequently reported types of dissociation for regular and problem gamblers, while experiencing *blackouts* is the least reported type of dissociation.

TABLE 5

	ANOV	/ A	Per	centage	of endo	rsements
Dissociation Items	<u>F</u> (3, 663)	₽	Gp 2	Gp 3	Gp 4	Pearson Chi-square
Feel like in a trance	30.14	.001	12.3%	14.9%	53.8%	p<.001
Feel like a different person	20.72	.001	24.2%	30.9%	61.5%	₽<.001
Lose track of time	22.28	.001	35.5%	48.6%	67.7%	p<.001
Experience blackouts	5.99	.001	3.1%	4.6%	13.8%	p<.001
Feel outside of self	14.34	.001	11.6%	17.7%	41.5%	p<.001
Total Dissociation	40.05	.001				

Results for the dissociative items

In the Gambling Questionnaire, respondents were asked to indicate their reasons for engaging in gambling behavior from a list presented to them. They were allowed to indicate as many reasons as they felt perceived were applicable. Table 6 depicts the percentages of responses per group for each reason. The problem and pathological gamblers, appear to endorse most reasons more frequently than the other two groups. As with the occasional gamblers, these individuals gamble primarily for reasons of enjoyment and excitement, followed by the desire to win money. Like the regular gamblers, almost 11% report gambling to promote relaxation. These problem/pathological adolescent gamblers are much more likely to report gambling for social involvement, to escape problems, to relieve their feelings of depression, to feel older, and to escape loneliness.

TABLE 6

Reason	Group 1	Group 2	Group 3	Group 4
		76.00	01.97	00.00**
Enjoyment	N/A	/6.2%	81.7%	92.3%**
Excitement	N/A	51.5%	66.9%	92.3%**
Make money	N/A	55.1%	70.9%	87.7%**
Social				
involvement	N/A	10.3%	12.0%	27.7%**
Escape				
problems	N/A	1.5%	2.3%	20.0%**
Alleviate				
depression	N/A	.7%	2.9%	10.8%**
Relaxation	N/A	5.6%	10.9%	10.9%
Feel older	N/A	2.2%	1.1%	9.2%**
Loneliness	N/A	.2%	1.1%	4.6%**
Other reasons	N/A	6.6%	5.1%	3.1%

Reported reasons for gambling

Group 1 consists of non-gamblers and therefore responses to this question were not applicable. **Statistically significant (p<.01) as tested by Pearson chi-square analysis.

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A comparison across groups, examining the reported reasons for gambling, reveals a linear increase from Group 2 to Group 4 for most variables, with the most dramatic increase being that of gambling to escape one's problems (1.5% to 20%). A marked linear increase is also noted for gambling to alleviate feelings of depression from Group 2 to Group 4 (.7% to 10.8%).

Comorbidity With Regular Drug and Alcohol Use

The adolescents were asked about their alcohol and illicit drug consumption (see Table 7). They were provided with a list of different types of drugs, alcohol, and cigarette smoking, and were required to indicate the frequency with which they use these substances (never, less than once per week, or once per week or more). Regular use is defined as using any of these substances a minimum of once per week. The percentages of adolescents who regularly engage in alcohol use are 4.9% for non-gamblers, 9.2% for occasional gamblers, 22.3% for regular gamblers, and 40.0% for problem and pathological gamblers (χ^2 (3, 674)= 67.21, p<.001). The percentages of adolescents who regularly engage in illicit drug use are 0% for non-gamblers, 2.7% for occasional gamblers, 5.7% for regular gamblers, and 10.8% for problem and pathological gamblers (χ^2 (3, 674)= 19.88, p<.001). The percentages of adolescents who regularly engage in cigarette smoking are 7.4% for non-gamblers, 12.2% for occasional gamblers, 29.2% for regular gamblers, and 44.6% for problem and pathological gamblers (χ^2 (3, 674)= 69.93, p<.001). Table 7 provides more detailed information regarding the different types of drugs and substances, and frequency of use. The percentage of total use of substances increase linearly from nongamblers to problem and pathological gamblers, indicating that substance use is positively correlated with degree of gambling participation.

Path Analysis

Path analysis, or structural equation modeling, was performed to test a model based upon Jacobs' (1986) General Theory of Addictions (see Figure 1), using LISREL 7 (Jöreskog & Sörbom, 1989). The analysis requires an explicit assumption of independent and dependent variables, and is a method of studying existing variability among variables. The primary purpose of path analysis is to separate correlations among variables into causal and non-causal components. This is accomplished by combining correlational data with an explicit theory of cause and effect. The cause and effects are inferred from the theory and the correlations provide the basis for the calculations.

TABLE 7

Substance	Group 1	Group 2	Group 3	Group 4	
Alcohol					
Uses the substance	38.7%	61.25	65.6%	78.5%	
Less than once per week	33.7%	51.9%	43.3%	38.5%	
Once per week or more	4.3%	9.0%	20.0%	36.9%	
Daily use	0.6%	0.2%	2.3%	3.1%	
Upper Drugs					
Uses the substance	0.0%	1.9%	2.9%	10.8%	
Less than once per week	0.0%	1.5%	1.7%	7.7%	
Once per week or more	0.0%	0.5%	1.1%	3.1%	
Every day use	0.0%	0.0%	0.0%	0.0%	
Downer Drugs					
Uses the substance	7.4%	8.5%	19.4%	32.3%	
Less than once per week	7.4%	6.8%	14.3%	23.1%	
Once per week or more	0.0%	1.2%	4.6%	9.2%	
Daily use	0.0%	0.5%	0.6%	0.0%	
Hallucinatory Drugs					
Uses the substance	1.8%	3.6%	5.7%	12.3%	
Less than once per week	1.8%	2.9%	4.0%	12.4%	
Once per week or more	0.0%	0.5%	1.7%	0.0%	
Daily use	0.0%	0.2%	0.0%	0.0%	
Cigarette Smoking					
Uses the substance	17.8%	30.3%	41.7%	67.7%	
Less than once per week	10.4%	18.2%	12.6%	23.1%	
Once per week or more	3.7%	4.4%	10.3%	12.3%	
Daily use	7.4%	7.8%	18.9%	32.3%	

Frequencies of drug, alcohol, and cigarette use for adolescents

The tested model includes five latent variables, or factors: physiological predisposition, emotional predispositions, the need to escape, comorbid addictive behavior, and gambling severity. These factors are theoretical constructs, and are comprised of the following measured variables: Excitability (HSPQ), Arousal, Self Concept (Harter), RADS, Total Dissociation score, Drug use, and the DSM-IV-J. The Disinhibition (SSS) subscale and the Apprehension Factor (HSPQ) were excluded from the model. Initially, Disinhibition was included in the model as a measure of physiological predisposition in place of Arousal, but the model did not fit the data, and so the variable was removed and



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Figure 1. Model adapted from Jacobs' (1986) General Theory of Addictions

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substituted with Arousal. The Apprehension personality trait was not included since the problem and pathological gamblers were not found to differ from the normative mean on this measure.

With respect to the diagram presented in Figure 1, measured variables are represented by rectangles. Factors, also called latent variables, are represented by ovals. Relationships between the variables are indicated by lines, and a lack of a line connecting two variables implies that no direct relationship has been hypothesized. A line with one arrow represents a hypothesized direct relationship between the two variables. A line with arrows at both ends indicates an unanalyzed relationship; it is simply a covariance between the two variables with no implied direction of effect. Thus, in this model, the need to escape is *directly* predicted by physiological and emotional predispositions, both latent variable factors. These factors are predicted by their respective measured variables. These measured variables are hypothesized to *indirectly* predict the need to escape, via their latent variable factors. Similarly, gambling severity is *directly* predicted by the latent variables of the need to escape and emotional predisposition, etc.

The maximum likelihood method was used to analyze the data. The measures of the overall fit are presented in Table 8. Some of the rules of thumb for a good model are the following: Chi-square should not be significant, the Goodness of fit index (GFI) should be greater than .90, the Adjusted Goodness of fit index (AGFI) should be greater than .80, and the Root Mean Square Residual (RMR) should be smaller than .10 (Kline, 1990). The results of the path analysis indicate that the model fits the data very well, and that it is an overall good model.

TABLE 8

Indices of overall fit of model

Chi-square with 9	Goodness of Fit	Adjusted Goodness	Root Mean Square
degrees of freedom	Index	of Fit Index	Residual
16.30, p= .059	0.994	0.980	.023

All the variables together explain 95% of the variance in the model. The total coefficient of determination for the latent variables is .75, indicating they account for 75% of the variance. The measured variables were found to account for 98% of the total variance. The R² coefficients identifying the amount of variance accounted for by each variable separately can be found in Table 9. The reader should be reminded that even though most of the R² values are small, the overall effect of these measures is large.

TABLE 9

Variance accounted for by individual variables

Squared multiple correlations		Squared multiple correlations		
for Y variables		for X variables		
Total dissociation DSM-IV-J Drug use	R ² = .36 R ² = .70 R ² = .05	Excitability $R^2 = .12$ Arousal $R^2 = .03$ Harter $R^2 = .33$ RADS $R^2 = .97$		

Direct effects between two factors are indicated by Gamma coefficients in Figure 1. The direct effect of physiological predisposition on the need to escape (γ 11= .63) indicates a fairly large effect, greater than the direct effect of emotional predisposition on the need to escape (γ 12= .534), which indicates a moderate effect. Similarly, the direct effect of emotional predisposition on gambling severity indicates a weak relationship (γ 22= - .181). However, the indirect effect of emotional predisposition on gambling severity indicates a weak relationship (γ 22= - .181). However, the indirect effect of emotional predisposition on gambling severity, via the need to escape factor, is .80, suggesting a very healthy effect. Similarly, the indirect effect of physiological predisposition on gambling severity is .93 indicating a strong effect. Thus, both the emotional and physiological predispositions are causally related to gambling severity, and this is manifested through the need to dissociate or escape. If the need to escape factor were to be removed, the model would not adequately fit the data, thus highlighting the key role of this latent variable. The indirect effects of physiological and emotional predispositions on drug use, via the need to escape, are .21 and .18 respectively

indicating a weaker causal relationship than to gambling severity. Considering the measure of drug use was not a validated measure of drug severity, these moderate causal relationships are not surprising.

Logistic Regression

A forward logistic regression analysis was performed through SPSS to assess prediction of membership into the group of problem and pathological gamblers (Gp 4). Separate analyses were performed for males and females to better understand the relative contributions made by the physiological and emotional predisposing factors. The variables included in the Model obtained via path analysis were employed in the logistic regressions, Excitability (HSPQ), Arousal, RADS, Self-Concept (Harter), Total Dissociation score, and drug use. Group 4 was included as the dependent variable.

Of the original 817 cases 210 were deleted due to the fact that they either were nongamblers and did not complete the Dissociation Scale, or for inaccurate completion of the HSPQ. Thus, 607 cases were included in the overall analysis, 309 were included in the analysis for males, and 298 cases were available for the analysis using females.

For the overall logistic regression, there was a good model fit (discrimination among groups) on the basis of two predictor variables alone (Excitability and Dissociation), correctly classifying 90.4% of individuals. The same results were obtained using only adolescent males, correctly classifying 85.2% of individuals. However, the analysis with females resulted in different findings. For females, three significant predictor variables for membership into Group 4 were obtained (RADS, Dissociation, Drugs) correctly classifying 96.3% of cases. The results of the performed logistic regression analyses suggest that, for membership into the problem and pathological gambling group, an abnormal physiological resting state is a better predictor for males, whereas emotional distress is a better predictor for females. The need and desire to escape form problems is found to be an important predictor for both groups. Degree of drug use among adolescent females suggests that they

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are more likely to become problem or pathological gamblers, but this was not found for males.

Logistic regression analyses were performed, substituting general drug use for use of upper drugs, and it was found that upper drugs accounted for most of the drug effect, correctly classifying 97% of cases for females as opposed to the previously reported 96.3%. The use of upper drugs in the analysis in place of general drug use did not alter the results for the overall regression using both genders, nor the analysis using only males. Both the Arousal and Harter Global Self-Concept variables were not found to contribute significantly, and thus were rejected as meaningful predictors in all logistic regression analyses. Table 10 depicts the relationship between the predictor variables and membership into Group 4 for the three performed analyses, using upper drugs as the variable reflecting comorbidity. The Wald statistic evaluates the contribution of an individual predictor to a model, and a significant result indicates a predictor that is reliably associated with Group 4 membership. The Odds Ratio is a measurement of relative risk when directionality is determined. For example, the results suggest that adolescents who dissociate while gambling are approximately 1.5 times more likely to become problem or pathological gamblers. Similarly, females who consume upper drugs appear to be more than 5 times more at risk for becoming problem or pathological gamblers.

Goodness-of-fit is evaluated with use of the Hosmer-Lemeshow statistic, where a good model produces a non-significant chi-square (Tabachnick & Fidell, 1996). By this criterion, we see that the three tested models provide adequate fit to a perfect model since p>.05 (See Table 11). The appropriateness of the three models suggests that males and females likely follow a slightly different path toward the development of a gambling addiction.

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TABLE 10

Variable	В	S.E.	Wald	dſ	£	R	Odds Ratio*
Total sample							
Excitability Dissociation	.36 .36	.08 .05	18.66 49.96	1 1	.001 .001	.20 .34	1.43 1.44
Males							
Excitability Dissociation	.37 .30	.09 .06	15.52 24.32	1 1	.001 .001	.22 .28	1.45 1.35
Females							
RADS Dissociation Upper drugs	.07 .52 1.69	.03 .12 .65	5.41 17.99 53.90	1 1 1	.02 .001 .001	.18 .40 .22	1.07 1.67 5.43

Logistic regression results for the three models

TABLE 11

Evaluation of Goodness of Fit: Hosmer-Lemeshow statistic

		Chi-Square	df	p
Total sample				
	Goodness of Fit	3.31	4	.51
Males				
·····	Goodness of Fit	7.44	8	.49
Females				
	Goodness of Fit	4.89	8	.77

Discussion

Strong support for the applicability of Jacobs' General Theory of Addictions for adolescent gamblers was obtained. Adolescent problem and pathological gamblers were found to have exhibited evidence of abnormal physiological resting states, showed evidence of greater emotional distress, reported greater levels of dissociation, and reported higher rates of comorbidity with other addictive behaviors. A path analysis testing a model

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adapted from the General Theory of Addictions was found to fit the data, providing impressive validation of the theory. The model tested shows a strong path from both the physiological and emotional predispositions, to a deliberate need to escape, to severity of gambling. Thus, gambling severity was empirically found to be caused by the need to escape, or dissociate, which is fueled by aversive physiological and emotional states. Gambling, therefore according to the model and Jacobs' theory, is a solution, or coping response, albeit a negative one, to aversive life conditions.

The logistic regression analyses, however, suggest that the path leading to addiction may be somewhat different for adolescent males and females. More specifically, males and females may be somewhat differentially *predisposed* to a gambling addiction. For males, the Excitability (HSPQ) personality factor and the total dissociation score were strong predictors for membership into the problem and pathological gambling group. For females, depressed mood, dissociation and upper drug use were meaningful predictors. These results suggest that adolescent males, more specifically, problem pathological gambling adolescent males, may fit the General Theory of Addictions better than females, as Excitability was found to be a measure of both physiological and emotional predisposition in the path analysis model. However, depression and the desire to escape are more characteristic of females who are predisposed to gambling problems. The fact that the use of upper drugs surfaced as a meaningful predictor of problem gambling may be an indication of a hypotonic physiological resting state. There is little doubt that depression includes abnormal physiological resting states as well as an emotional factor, although this relationship is not clear. It is possible that an under-aroused resting state manifests itself as excitable behavior in males, and the drive to use stimulants in females.

The adolescent problem and pathological gamblers indicated their preference for stimulating environments and activities, and obtained higher scores on the Disinhibition subscale of Zuckerman's Sensation Seeking Scale. These results provide indirect evidence of the theory that gamblers deliberately select stimulating experiences, such as gambling, to

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self-correct a hypotonic physiological resting state. Furthermore, adolescents also indicated gambling for reasons of excitement, to escape problems, and to alleviate depression. These reports provide anecdotal support for the theory as well. Of particular importance is that these adolescents are *aware* of their reasons for engaging excessively in gambling activities. Jacobs (1989) has consistently maintained that gambling is a *deliberately* chosen means for achieving a dissociative state, or altered state of identity.

Problem and pathological gamblers appear to have low arousal resting states. Individuals high on Extroversion, as defined by Eysenck, are believed to have low levels of cortical arousal. Sensation seeking (Eysenck, 1967) and the Excitability factor of the HSPQ have been found to be positively correlated with Extroversion, and are both characteristic of problem and pathological gamblers. Gambling activities are stimulating and thus would be a logical attraction to individuals seeking external stimulation. The problem/pathological adolescents indicated *feeling best* when in a stimulating environment, to a greater degree than those in the other three categorization groups, thus providing greater support to the hypothesis that gamblers may be characterized by low levels of cortical arousal. This premise requires confirmation through physiological brain research with pathological gamblers, providing data directly measuring cortical activity, rather than inferring physiology from behavioral measures.

Low self-esteem, a construct found to be associated with the occurrence of other addictions in adolescence (e.g., Simon et al., 1995), was not found to be a meaningful predictor in the logistic regression analyses, nor did it account for an appreciable amount of variance in the path analysis. This may be due to the limited sensitivity of Harter's Global Self Concept as a measure of self-esteem. It is also a plausible that other measures, such as the RADS and the Excitability personality trait, overshadowed its effect in these statistical procedures. Alternatively, self-esteem may not be a meaningful construct in the development of addiction. This last hypothesis seems unlikely in light of the extensive literature suggesting the self-esteem scores to be a risk-factor associated with the development of substance dependencies (e.g., Harrison & Hoffman, 1989; Simon et al., 1995), as well as the significant differences obtained in self-esteem across the four groups of gamblers in the current study.

The occurrence of depression among adult pathological gamblers has been identified by numerous researchers, but it was not known whether similar results would be obtained with adolescents. It turns out that the problem and pathological group of adolescent gamblers reported higher levels of dysphoric mood and clinical depression than their peers. Twenty-three percent of these adolescents qualified for a diagnosis of clinical depression on the Reynolds Adolescent Depression Scale. Females account for slightly more than half of these cases of depression. This finding is meaningful considering that the problem and pathological group is predominantly male (53 males, 12 females). It is possible that depression plays a larger role in the development of pathological gambling in females than in males, although such conclusions are not yet warranted due to the small number of females in the present sample. More research examining gender differences amongst male and female pathological gamblers is needed. The results of this study suggest that depression and dysphoria play a significant role in the syndrome of pathological gambling. Gambling activities help these adolescents cope with their already existing depression. Support for this comes from other researchers who propose that gambling is engaged in to relieve depressive and hypomanic tendencies, anxiety, and low self-esteem (Bolen, Caldwell, & Boyd, 1975; Fisher & Bellringer, 1996; Ohtsuka, Bruton, DeLuca, & Borg, 1997). However, depression may also play a role in the development of gambling problems other than its link to hypotonic physiological resting states and emotional distress, but rather due to the negative cognitive styles typical of depressed individuals (McCormick, 1988). Individuals with these pessimistic thought processes and attribution styles may be more prone to developing an external locus of control, which has been moderately linked to problematic gambling behavior (Moran, 1970).

The percentage of substance use increases with the degree of gambling participation. Problem and pathological adolescent gamblers are considerably more likely to drink, take illicit drugs, and smoke, than non-problem gamblers. In hindsight, it would have been useful to have included standardized scales assessing substance use, the degree of abuse, and level of addiction. It is difficult to infer, from only self-reports of frequency of substance use, abusive or addictive qualities to their actual use. Testing the theory with one type of addiction is a good start. The evidence gathered in the current research suggests that Jacobs' theory is a plausible one for the development of pathological gambling. A stronger test of the theory will incorporate many different types of addictions into the model. The rational for including drug use in the path analysis model was to test whether an increase in drug use was associated with physiological and emotional predispositions. A causal effect was established, indirectly, via the need to escape, although the effect was moderate at best. Considering that the drug use measure consisted of a 4 point scale (never, less than once per week, once per week or more, daily), and only the frequency of use is evaluated, the moderate effect of the predisposing factors on drug use was not surprising. Nonetheless, this moderate effect may serve as preliminary evidence that the model holds true for all addictions, which is the premise underlying Jacobs' theory.

The preliminary evidence is very encouraging and holds with it many implications. With respect to children and adolescents, the problem of gambling can be targeted in the school system in tandem with the other addictions, and the development of the prevention interventions can be informed by the theory, with emphasis on the predisposing factors. Feelings of worthlessness, inferiority, and depression can be remedied and children can be directed toward other, more appropriate activities, which provide similar levels or types of stimulation. Knowledge of the predisposing and "at-risk" traits (also see results of Study II) in a child or adolescent presenting with an addiction will provide counselors, psychologists, social workers, and school officials with a deeper understanding of why

adolescents are engaging in addictive activities. The direct instruction of alternative coping mechanisms may be a beginning step in helping adolescents deal with the many familial, academic, economic, and social pressures facing them.

Another implication is directed toward mental health professionals and physicians and their efforts at understanding addictions. As Jacobs (1989, p. 37) noted, "*Should this prove to be, it could redirect the current flow of scarce dollars from multiple and often redundant projects into a powerfully focused and cost effective program of coordinated research...*". There are no doubts that numerous benefits will manifest themselves through confirmation of the General Theory of Addictions, the principal one being the possible unification of addiction prevention research into a pooled effort, as opposed to the continued separate research paradigms.

While Jacobs (1986) emphasized the necessity of a conducive environment, this theory may not place enough emphasis on the role of society and family in the development of addiction. Research with children (Gupta & Derevensky, in press) highlights the influence of familial and social acceptance of juvenile gambling beyond having a parent with a severe gambling problem. It nevertheless remains true that most children who are introduced and provided repeated exposure to gambling by their parents and 'significant others' will never develop a real gambling problem. Nonetheless, some will, and societal acceptance of gambling most likely plays a role in this. The same premises can be stated for other addictions as well (e.g., alcohol and to a lesser degree smoking which has recently seen a huge backlash). Therefore, other external factors likely have a meaningful place in a comprehensive general addictions theory.

One of the weaknesses of this study is the lack of an appropriate measure which taps into feelings of *rejection and inferiority* emanating from childhood, as proposed by Jacobs. It is however plausible that these feelings stemming for childhood do not play as large as role as has been suggested. Dysphoria and depression, may be an accumulation of

past early childhood experiences, and may be a better conceptualization of the emotional predisposition to addiction.

It remains unclear, and is not specified in Jacobs' theory, whether one's physiological resting state is fixed across the life span, or whether it changes over time with age or as a result of certain interacting environmental circumstances. This would shed light to the issue of whether an individual is born with the physiological predisposition, and remains at risk for life, or whether if environmental, economic or social circumstances change, and individuals can move in and out of the *predisposed* group. The definition of *physiological resting state* remains somewhat vague, and may refer to either cortical arousal, peripheral arousal, or biochemical balance. Further research is needed to provide a stronger conceptualization and reliable measures of an individual's physiological resting state.

While adolescence remains a period of rapid growth and change, physically, socially and emotionally, it also represents a time of experimentation. It is during this developmental period that many adolescents begin smoking, drinking, experimenting with drugs and sex, and engage in gambling activities that were previously restricted. There is little doubt that excessive risk-taking and the use of various substances will decrease with maturity, and that the excitation brought about from gambling will be replaced by alternative activities. Nevertheless, for those individuals at-risk for developing an addiction, adolescence remains a critical period.

We are now one step closer to understanding the etiology of gambling dependency in adolescents. It is hoped that others will continue to test Jacobs' theory, with use of different addictions as the prototype, and with different populations. Further validation of the theory will serve to provide addictions research with the *tangible and reliable* experimental evidence of a general theory of addictions and make an important theoretical and clinical contribution.

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Summary discussion

The three studies presented were aimed at addressing several issues. The first study sought to examine the prevalence rates and correlates of gambling and pathological gambling among adolescents. The purpose of the second study was to examine the personality and risk-taking characteristics of adolescent gamblers involved in varying degrees of gambling participation, and to examine the usefulness of the Arnett Inventory of Sensation Seeking in assessing risk-taking in adolescent gamblers. On a more theoretical level, the goal of the third study was to build upon Studies I and II by empirically testing Jacobs' (1986) General Theory of Addictions with adolescent pathological gamblers. Prevalence Rates of Adolescent Gambling Behavior

Gambling amongst adolescents was found to be more popular than cigarette smoking, alcohol and drug consumption. Of the total sample, 80.2% of adolescents reported gambling in the previous year, 35.1% do so a minimum of once per week, and 4.7% met the criteria for pathological gambling. Contrary to previous research (i.e., Ladouceur et al., 1994; Lesieur & Klein, 1987), males were not significantly more likely to be gamblers than females (81.5% vs. 78.8%). This may be an indication that the gender gap is decreasing, with gambling being perceived as a more socially acceptable activity for females. Nonetheless, regular gambling participation is twice as high for males than females, and males are considerably more likely to qualify as pathological gamblers. Male adolescents remain at heightened risk as the frequency and intensity of their gambling participation is much greater.

The rates of gambling participation showed little variability across age groups, although grade 11 students are likely to gamble more regularly than grade 7 students. Grade 9 students (ages 14 and 15) showed the highest rates of pathological gambling, with 5.7% meeting the DSM-IV-J criteria. Interestingly, grade 11 students yielded the lowest rates of pathological gambling, at 3.1%. The question of whether this decrease with age is a result of *natural recovery* or the result of a *cohort effect* remains to be ascertained.

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Support for both hypotheses was obtained by Stinchfield et al. (1997), whereby a slight decrease in overall adolescent gambling rates from 1992 to 1995 was found, as well as an increase in percentage of gamblers, primarily boys, who appear to be over-involved in gambling. The authors conclude that, "In fact, there was limited support for the hypothesis of increased gambling among youth ... " (p. 44). Follow-up or longitudinal studies are ideal for providing the answer to this debate, and more are needed. The idea of natural recovery is parsimonious with the fact that risk-taking is reported to decrease with age after adolescence (Arnett, 1994; Zuckerman et al., 1978). As gambling behavior and risk-taking are strongly correlated, a decrease in gambling involvement is likely as well. However, the results in Study II reveal that risk-taking does not decrease with age from grade 7 through grade 11, in general, but rather increases to a significant degree on the Disinhibition and Experience Seeking subscales of the SSS, whereas rates of pathological gambling decrease. Furthermore, the results from Study II suggest there is reason to believe that gambling behavior is maintained through several mechanisms other than risk-taking, such as the excitement and enjoyment provided (e.g., Gupta & Derevensky, 1996), the occurrence of dissociation (Kuley & Jacobs, 1988), and the faulty cognitions which result from excessive gambling (Griffiths, 1990; Ladouceur, Gaboury, Dumont, & Rochette, 1988). Although it may be that risk-taking properties draw high sensation-seekers to gambling, it is likely that other mechanisms provide the persistence or maintenance of this behavior. The authors propose that while pathological gambling rates appear to decrease with age, they may not. Rather, a cohort effect (due to the cross-sectional design of the present study) is likely accounting for this finding, such that adolescents in grades 7, 9, and 11 can not be directly compared to each other due to the different exposures to gambling they have experienced in their lives. In other words, the grade 7 students who participated in this research are expected to show slightly increased rates of pathological gambling by the time they reach grade 11, as opposed to a decrease in rates, given they will have had more exposure to advertisements, availability and accessibility of gambling venues, and the example of parents engaging in available gambling activities.

Specific Gambling Activities

Purchasing lottery tickets, playing cards, and betting on sports pools are the three most popular gambling activities amongst adolescents. At the time of data collection, legalized (government controlled) Video Lottery Terminals (VLT) were not as widespread in the Montreal area. Since then, they have grown in number and in locations such as restaurants and pool halls. Although they are located in areas (i.e., near the bar) generally restricted to adults, 18 years and older, our clinical work suggests that adolescents, especially older adolescents, have easy access to these VLT's, indicating that the age restrictions are not being strongly enforced. Of the adolescents in this study, approximately 35% indicated playing slot machines and/or video poker machines combined. If our clinical work is of any indication, a follow-up study of these adolescents would likely show an increase in gambling machine playing as a direct result of the proliferation of VLT machines in the Montreal community. Actually, the increased proliferation of VLT machines is worldwide, as governments are addicted to the vast revenues.

Bingo playing was reported by 35% of adolescents, a finding which challenges the stereotype of it merely being a game for "older women". Actually, of those who gamble a least once per week, bingo playing is reported by males slightly more than females. More research is warranted where bingo playing is concerned, such as to identify the demographic characteristics of regular players. Bingo halls are widespread, and operate as independent businesses. As such, in many communities, no age restrictions are generally imposed. Steps have been taken, however, toward governmental control of the bingo industry, similar to lottery tickets sales, VLT's, and casino operations. Although many are angered by this movement, several positive outcomes would likely result, one being the restriction of bingo playing to those over the legal age. It is becoming increasingly evident

(Gupta & Derevensky, in press; Study I) that initial gambling experiences occur with family members for the most part. Bingo represents an environment where children go with their parents or grandparents to spend an enjoyable afternoon or evening of entertainment.

Cognitive Perceptions of Gambling

It is a natural instinct to prefer activities over which we have some control, as opposed to things beyond the limits of our control. Ironically, gamblers present an exception to this premise, since most gambling activities operate upon the laws of randomness. There are those who would argue that some gambling activities are partially skill oriented, such as blackjack (operating on the laws of probability). While gambling is largely composed of games of chance, the odds are always strongly favored for the 'house'. If this were not the case, gambling would not be considered a risk-taking phenomenon, and the gambling industry would not be making hundreds of billions worldwide on an annual basis. When individuals gamble, they risk losing their money in exchange for the possibility of winning, and ultimately place the outcome in the hands of fate. Interestingly, the responses from adolescents indicated that they are very aware that gambling activities are based upon chance, but at the same time endorsed the belief that a substantial amount of skill is required to be a "good gambler" (Study I). Can such responses be interpreted as a manifestation of cognitive dissonance, with adolescents thinking, "I gamble a lot, therefore I must believe I can exert some control", in order to justify their playing? The fact that the role of skill in gambling is endorsed to a meaningful extent by both pathological and non-pathological gamblers suggests that this interpretation may not be a plausible explanation, because one would expect pathological gamblers to endorse the role of skill to a greater degree than non-pathological gamblers if this were to be the case. Males and females provided similar ratings of the amount of skill involved in gambling activities. This was unexpected considering the discrepancy in differing rates of pathological gambling for males and females. However, males indicated a higher mean

level of *perceived* gambling ability than females, indicating they perceive themselves to be fairly skilled at gambling. Thus, inherent in this concept is their belief that skill is an integral part of gambling. A better understanding of the issues concerning the roles of skill and luck as they pertain to gambling will paint a clearer picture of what motivates individuals to justify their perseverance with gambling in the face of tremendous financial and personal loss. Jacobs (personal communication) expressed the belief that those activities which involve the greatest amounts of perceived skill would be more conducive to risk-taking. This theory makes intuitive sense considering individuals would likely not take great risks with activities they feel they have little or no control over. The gambling industry capitalizes upon this fact by creating illusions of control, such as posting the previous roulette outcomes on a large board, intimating to players that they may use this information to *calculate* the outcomes of future spins.

Parental Gambling

The comparisons of pathological and non-pathological adolescent gamblers provided insightful and meaningful information. Similar to research which reports a higher incidence of pathological gamblers having parents with gambling problems (Lesieur & Klein, 1987; Lorenz & Shuttlesworth, 1983), the results of Study I indicate that 24% of pathological gamblers perceived their fathers as having a gambling problem, and 10.5% reported their mother to have a similar problem. A limitation of this information is the lack of direct reporting from the parents themselves. It is unknown whether the adolescents can accurately evaluate whether their parents experience gambling problems. However, their responses do provide us a window into *their perceptions* of their parents' gambling habits, which undoubtedly influences their own opinions and actions nonetheless.

Gambling, Depression, and Suicide

The group of adolescent problem and pathological gamblers reported higher levels of dysphoric mood and clinical depression than their peers (Study III). Approximately 10% of the non-gamblers, 12% of the occasional gamblers, 11% of the regular gamblers, and 23% of the problem and pathological gamblers met the criteria for clinical depression. Depression was shown to be an important contributor to the development of pathological gambling in the path analysis. These findings highlight the key role of depressive mood as a precursor to pathological gambling.

Of particular concern is the finding that approximately 55% of the identified pathological gamblers reported engaging in suicide ideation (compared to 28.4% for the entire sample) and 8% have admitted attempting suicide (as compared to 5.3%). There is no information to indicate that gambling itself is the cause for these alarming findings. It is possible that suicide ideation and attempts are linked to depression as opposed to the gambling itself. It is also possible that suicidal behaviors are associated with involvement in other comorbid behaviors of addiction, such as excessive alcohol or drug abuse. Nonetheless, similar reports of suicide ideation and attempts have been ascertained with adult pathological gamblers, after many years of struggling with a gambling problem and suffering all the financial, social and emotional losses that accompany this addiction. For example, Moran (1970) reported that 25% of pathological gamblers had attempted suicide, whereas Livingston (1974) reported 15% had suicide attempts with a similar population, and Custer and Custer (1978) reported 18% of the Gamblers Anonymous members having made suicide attempts. McCormick, Russo, Ramirez, and Taber (1984) found that 12% of hospitalized adult pathological gamblers had made a lethal suicide attempt, 12% had made serious preparations for an attempt, and another 24% had experienced repeated suicidal ideation.

Delinquent Activities and Gambling

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Obtaining money to gamble is usually a primary concern for individuals who are heavy gamblers. Fifty percent of the adolescent pathological gamblers reported stealing money for gambling purposes, as compared to the 2% of non-pathological gamblers reporting similar actions. It is not surprising that the pathological gambling group was

found to be 5 times more likely to have legal actions pending against them. Another 55% admitted to borrowing money in order to gamble.

Similar to the Alberta study (Wynne at al., 1996), our sample of problem and pathological gamblers were more likely to be smokers (67.7%), drinkers (78.5%), and use illicit drugs, including upper drugs (10.8%), downer drugs (32.3%), and hallucinogenics (12.3%). Thirteen percent of the adolescent pathological gamblers managed to actually take a trip (i.e., Atlantic City) for the primary purpose of gambling. This finding was unexpected considering their young ages.

Motives for Gambling

Although many think of "quick" or "easy" money as being the primary motive for engaging in gambling activities, the findings in Study I indicate otherwise. Gambling for reasons of excitement and enjoyment surpass monetary incentives, for both problem and non-problem gamblers. For pathological gamblers, gambling also appears to be a means of escaping problems (26.3%), alleviating depression (13.2%), relaxation (13.2%), and feeling older (13.2%). These reported percentages are at least double those reported by non-pathological gamblers. Therefore, for those who gamble excessively, gambling serves a multitude of purposes, and can be very reinforcing for these reasons. The fact that these adolescents were aware of their reasons for gambling suggests that gambling is a specifically chosen means-to-an end. Approximately 30% of pathological gamblers indicated gambling to escape negative emotions (gambling to escape problems and to alleviate depression combined). They actively seek out gambling opportunities for the positive effects it allows the player to experience. If this is accurate, then it may be said that pathological gamblers choose this addiction through mechanisms of their own conscious choice, as opposed to feeling *compelled* to gamble. This conceptualization of gambling carries with it tremendous treatment implications, with the focus of intervention focusing on making appropriate choices and finding adaptive coping strategies as opposed to only treating compulsions and faulty cognitions. Despite the vast amounts of research

conducted with problem and pathological gamblers, the specific motivations for gambling are still not clearly delincated. Are they subject to vast individual differences? Do they differ developmentally? Are they physiological, emotional, and/or social? For now, we can rest assured that the excitement provided by gambling is the most endorsed reason, a finding consistent with previous research concerning children age 9-12 (Derevensky, Gupta, & Della-Cioppa, 1996; Gupta & Derevensky, 1996; in press).

Predisposing Risk Factors for the Development of an Addiction

The hypothesis that individuals are in fact predisposed to an addiction is shared by many. For example, Greenberg (1980) maintains that individuals are predisposed to an addiction through the inheritance of a "thick stimulus barrier", resulting in a hunger for stimulation. Jacobs (1986; 1987) proposed his own theory which accounts for why certain people develop dependencies whereas others do not. Jacobs' General Theory of Addictions maintains that certain individuals are predisposed for addiction, be it to drugs, food, alcohol, shopping, etc. He explains that an addiction is an attempt to self-correct tension and distress arising from an abnormal physiological resting state (predisposing factor #1) coupled with feelings of rejection, inferiority, and low self-esteem (predisposing factor #2). The key to all addictions, according to Jacobs, is the dissociation from reality (or escape) they provide. The type of addiction one chooses is related to the direction of their abnormal physiological resting state, with those experiencing chronic under-arousal seeking stimulation, and those individuals chronically hyper-aroused seeking depressant effects.

Jacobs' theory appears to be an elaboration upon the *optimal level of stimulation and arousal theories* introduced in the psychological literature as early as 1893 (Bruer & Freud, 1895; 1937; Wundt, 1893; Yerkes & Dodson, 1908). These theories proposed that individuals of all ages seek optimal levels of arousal from their environment in order to achieve their greatest potential. Between 1908 and 1950, there appeared to be a lack of interest in the theoretical development of the optimal level of stimulation construct.

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However, in 1955, Hebb revived the theory and described two functions of sensory events: 1) cue function (guides behavior) and 2) arousal vigilance (activates behavioral system). The search for optimal arousal levels was postulated to be the primary driver of behavior. Lindsley (1961) conceived the reticular formation of the brain as a homeostatic system, which regulates the amount of stimulation entering that area of the brain. He suggested that the curiosity and hyperactivity of children may be in part a function of the reticular-cortical system, which gives preference of passage to novel stimuli and is implicated in the blocking of responses to repeated stimuli (habituation). Although the concept of biological drives to seek optimal levels or arousal is not novel, the addition of the psychosocial elements, as well as the emphasis on conducive environments, has shed a whole new light on the possible etiology of addictive behavior.

Other theories may be applied in the explanation of gambling behavior. For example, Cloninger (1988) has accounted for the association of noradrenaline with pathological gambling in terms of his noradregeneric theory of reward dependence. Pathological gamblers are believed to have inherited low basal rates of noradrenaline firing, and therefore experience post synaptic noradrenaline hypersensitivity. This system is hypothesized to facilitate the development of a dominant reward-driven response style. In his theory of personality and psychopathology, norepinephrine circuits are responsible for behavior maintenance, and make up the *reward dependence* behavioral dimension. Cloninger maintains that the behavioral maintenance system responds to conditioned signals for reward or relief of punishment by providing resistance to extinction. Otherwise stated, the gambler, who has low noradrenaline firing, is resistant to the repeated punishment experienced as a result of their gambling problem, in order to maintain reward or relief from negative life situations (likely experienced through the mechanism of dissociation or escape).

Studies II and III sought to investigate the hypothesis of *predisposition* to an addiction by examining personality correlates and by testing Jacobs' General Theory of

Addictions, considering the key role of predisposition in the formulation his theory. Jacobs' theory carned support in the fact that gambling and risk-taking are positively correlated. It was demonstrated in Study II that depending upon their degree of gambling involvement, adolescents obtained increasing risk-taking scores on the Sensation Seeking Scale (Zuckerman, Eysenck, & Eysenck, 1978) and the Arnett Inventory of Sensation Seeking (AISS) (Arnett, 1994), with problem and pathological gamblers exhibiting the greatest risk-taking. Kuley and Jacobs (1988) found, utilizing Zuckerman's Sensation Seeking Scale, problem gamblers scored significantly higher than social gamblers on the Disinhibition, Boredom Susceptibility, and Experience Seeking subscales. Similar findings were obtained by Dickerson, Hinchy, and Fabre (1987), and the identical results were obtained with this sample of adolescents in Study II. It appears as though individuals involved in risk-taking behaviors, such as gambling, tend to seek environments with high levels of arousal in an attempt to compensate for low cortical arousal (Eysenck, 1981). The AISS Intensity subscale was strongly correlated with gambling behavior, indicating that activities providing stimulation intensity, as opposed to novelty, is what gamblers seek as arousal. It is for this reason that the authors believe the AISS Intensity subscale to be a useful measure in assessing sensation seeking among adolescent gamblers. Eysenck explains that low cortical arousal is associated with behavioral manifestations of distractibility, high motor activity levels, and extroverted social behavior. High sensation seekers generally appraise risk situations as less risky than low sensation seekers, but given equal appraisal of risk, the high sensation seekers anticipate more positive arousal whereas low sensation seekers anticipate more fear or anxiety (Zuckerman, 1979). The fact that under-arousal and high sensation seeking have been proposed as a basis for hyperactivity in children (Satterfield, 1976; Zentall & Zentall, 1983), provides a logical framework for the effectiveness of pharmacological treatments with the use of stimulant drugs. A similar explanation is plausible and applicable to gamblers, with individuals experiencing low cortical arousal attracted to the stimulation associated with gambling
participation. Zuckerman (1979) has accumulated a number of interesting links between biological processes and the personality construct of sensation seeking. His findings suggest that individuals with higher sensation seeking needs engage more frequently in gambling activities, and are more likely to engage in high-risk activities such as drinking while driving (Zuckerman, 1994). Quay (1965) maintains that the application of sensation seeking behavior is merely an attempt to correct low cortical activity. The HSPQ Excitability factor represents a dimension of personality ranging from placid and calm to excitable, impulsive and active; traits believed to tap into physiological arousal levels. The results obtained in Studies II and III indicate that problem and pathological gamblers are high on this trait, a likely indication that they are intrinsically low in terms of physiological arousal. They also scored high on the Cheerfulness factor, which is a measure of sociability. Eysenck's (1983) heritability research concluded that approximately 60% of the total variation for sociability, impulsivity and extroversion can be attributed to a genetic link. Heritability of sensation seeking tendencies was reported at approximately 70%. McBurnette (1992) explains that biological mechanisms show remarkable stability across time, and therefore they would appear to be innate or fixed early in life. These findings strengthen the argument that certain individuals may be innately predisposed, from birth, to have these personality traits which are strongly correlated with gambling and other addictive behaviors.

Gambling and Related Personality Traits

The view that there is some underlying personality type at the root of addictive behavior, such as high sensation seekers, for example, first originated with personality trait theorists. The research to date, using adults, indicates that there may exist several personality profiles amongst pathological gamblers (i.e., Graham & Lowenfeld, 1986) such as personality disorders, paranoia, emotional instability, and alcoholism. Numerous studies examining pathological gamblers have found comorbidity with Antisocial Personality Disorder (Bland, Newman, Orn, & Stebelsky, 1993; Chen, Wong, Lee, & Chan-Ho, 1993; Kroeber, 1992). Peck (1986) described pathological gamblers as possessing certain personality traits such as above average intelligence, high energy levels, and are attracted to highly stimulating situations. Many personality tests have been used in research, yet no real clear "gambler's personality" profile emerges. Considering the fact that most studies are conducted on adults already in treatment, the results obtained are tenuous at best. Furthermore, it is still unclear as to whether the personality traits identified preceded and thus contributed to pathological gambling or followed after as a result from the gambling problem.

Study II is the first to differentially examine personality characteristics among adolescents dependent upon their level of gambling involvement. Examining personality traits in young teenage gamblers provides meaningful insight into the possible presence of pre-existing personality traits which contribute to their gambling status since their gambling patterns are relatively new and are unlikely to have altered their personality profiles to a significant degree. This assumption is especially true if one accepts that these traits are believed to remain relatively stable across time. Of the 14 personality factors measured, 10 were found to differ significantly across the four categories of individuals: non-gamblers, occasional gamblers, regular gamblers, and problem and pathological gamblers. Of greater importance, however, are the 4 personality factors on which the problem and pathological gamblers deviate from the normative mean. They, in general, appear more impulsive and overly active, non-conforming, and have poor self-discipline. These findings are not unlike those found in the profiles of delinquent institutionalized adolescents (Cattell, Cattell, & Johns, 1984). Furthermore, the sensation seeking indices (SSS and AISS) revealed that the problem and pathological adolescent gamblers tend to be disinhibited, bored with routine and repetition, and enjoy most stimulation of the senses, which is consistent with Custer's (1980) description of gamblers as being highly distractible individuals who tolerate boredom poorly, and who avoid or do not complete tasks which they perceive as dull.

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Other research on personality traits of gamblers (i.e., Tyndel, 1963; Livingston, 1974) has suggested that they are individuals overcome with guilt and anxiety. Such findings were not obtained in Study II. The Apprehension HSPQ trait is a measure of similar constructs, with those scoring high in this trait being guilt-prone, self-blaming, and anxious. Although the problem and pathological gamblers obtained a significantly higher score for Apprehension compared to the regular, occasional and non-gamblers, they did not differ significantly from the normative mean.

Empirical Support of Jacobs' General Theory of Addictions

Substantial support for Jacobs' General Theory of Addictions was obtained from multiple measures, the structural equation modeling, and logistic regression. Indirect evidence of abnormal physiological resting states amongst problem and pathological gamblers (Excitability HSPQ factor, and the SSS), emotional distress (depression and low self-esteem), higher dissociation while gambling, and comorbidity with other addictive behaviors (e.g., cigarette smoking, drug use, and alcohol consumption) was obtained. Interestingly, the HSPQ Excitability personality factor appears to be both a measure of physiological resting state as well as a measure of emotional well being, as indicated by the path analysis. This factor emerged as a meaningful measure for this area of research with adolescents. Dissociation, that is, "the need to escape" was found to play a key role in the proposed path analysis model. The model, which showed a good statistical fit to the data, was developed to test Jacobs' theory. The analyses revealed that the predisposing factors have their greatest effect on gambling severity via the need to escape, as opposed to a direct effect. A similar path, albeit not as strong, was obtained for drug use.

It has been stated by several clinicians and researchers that the common link of all addictions is the notion of escape. Better stated, all addictions permit the individual an immediate, albeit temporary, escape from pain and stress. Unfortunately, the negative consequences ultimately outweigh the pleasure of escape from reality. Seen in this light, addictions serve as an adaptive mechanism, or way of coping. It serves a purpose, and the addict is temporarily *fixed* for as long as the gambling, drugs, alcohol, food, sex, etc. lasts. Coping can take on positive and negative forms. Addiction is likely viewed by many as an undesired form of coping; even the addict may share this opinion. However, the reinforcing properties of negative reinforcement (avoidance of undesired circumstances) must not be underestimated. It seems as though adolescents are as susceptible as adults, if not more so, to the attractive elements of gambling, namely excitement and escape.

Based upon findings by Zuckerman and Eysenck, there is sufficient evidence, both data driven and anecdotal, to at least consider that gamblers seek stimulation in order to self-correct an under-aroused physiological resting state. Not only is risk-taking linked with low cortical arousal, but it is also directly linked with problem and pathological gamblers. The results from Study III indicated that problem and pathological gamblers feel best around stimulating activities and environments, and they indicate gambling primarily for the excitement it provides, more so than non-problem gamblers. It seems warranted to conclude at this time that youth and adults who are overly active, and prefer stimulating environments, will exhibit a greater propensity toward gambling than those not fitting this description. It also appears that individuals with dysphoria or depression find comfort in gambling. Some problem and pathological gamblers as much as indicate that they gamble to lift their depression and escape problems. As such, it appears that gambling is chosen by a certain subset of individuals as an activity which will meet their needs. This whole notion of explicit choice implies that individuals are not swallowed up by a gambling addiction against their will, but rather, they knowingly dive into a pool of addiction to experience its positive reinforcing qualities, disregarding the imminent negative consequences down the line. These findings support Jacobs' (1996) General Theory of Addiction, with respect to his premise that problem and pathological gamblers suffer from abnormally depressed arousal levels and that they in turn will orient themselves toward activities which will provide that missing excitement and stimulation.

Can an addiction be conceptualized as a form of self-medicating? If specific addictions are selected for their particular reinforcing properties, then they may be perceived as a means toward achieving physiological homeostasis. For example, if a person with a hypotonic physiological arousal level selects gambling, upper drugs, and cigarette smoking for their stimulant properties, then alcohol must be the example of the reverse mechanisms such that individuals seek depressant effects of alcohol to subdue an overly aroused cortical condition. Do overeaters eat excessively to correct abnormal glucose or insulin levels? Are our addictions so hand-picked as to satisfy our faulty biological wiring? Exciting research lies ahead.

This research raises the question of whether or not males and females share the same etiology of problem gambling behavior (Study III). Depression was found to play a larger role for females, whereas male problem and pathological gamblers seem to be more affected by their arousal levels. It is possible that Jacobs' theory holds true for all, but with a stronger emphasis on the physiological predisposition for males, and emotional predisposition for females. This avenue of research examining gender differences in the etiology of gambling problems should be of priority.

Validation of the theory highlights the need for addictions research to pull together. Different divisions of addiction research can serve to benefit each other. Similarly, large collaborative studies, combining different addictions into common research paradigms will provide answers to many unanswered questions. A starting point would be to test the General Theory of Addictions with a variety of addictions. The theory model tested in Study III consists of an oversimplified model of Jacobs' General Theory of Addictions. It is proposed that future research testing this theory include other important elements, such as measures of current stress levels, family functioning, and coping styles. Study III has lent tremendous support to the hypothesis that individuals engage in excessive and pathological gambling practices in order to feel better and escape, from pain, indicating that gambling (and likely other addictive behaviors as well) can be conceived of as a coping 136

mechanism. Future research examining gambling addiction, with all age groups, would benefit from including measures of coping.

Gambling and Coping Abilities

It would not be surprising to find, through research, that problem gamblers exhibit poor, maladaptive, coping styles which fuel their addictive behavior, and which are passed on to their children, thus encouraging a second generation of addiction. Children and adolescents are exposed to complex patterns of behavior that show adults coping with stress by use of addictive substances and behaviors. A study conducted in California (Jacobs, Marston, Singer, Wedaman, Little, & Veizades, 1989) with 9th to 12th graders reported that without exception, children of parents described as problem gamblers showed higher levels of use of alcohol, cocaine, amphetamines, increased over-eating and gambling. Children, especially those who may be predisposed to addiction, learn that such excessive behaviors are adaptive in their own way. Pursley (1991) outlines the commonalties between different addictions and explains, using the example of adolescents who consume drugs and others who gamble, that both groups of addicts strive for a mood change, escape, and a way to cope with a difficult and alienating reality, and are willing to pay a high price for the desired effect. Eventually, the addiction itself is the cause of much pain, thus reinforcing the need/desire to experience a high, resulting in an inability to see oneself outside of the addiction.

One may ask, why do adolescents need to escape from so much pain? What is the pain all about? The explanations are endless, and are believed to stem from low self-esteem and depression, which are not uncommon in times of divorce, broken homes, and economic problems. Some may be escaping pain resulting from abuse or neglect. Others may be escaping emotional difficulties emerging from having learning disabilities. For example, children with ADHD are prone to the development of low self-esteem due to their difficulty focusing and controlling their behavior, and the constant reprimanding directed their way as a result.

Even for those who come from solid, supportive families, adolescence is a turbulent period of development, fraught with uncertainty issues, and insecurity. Study III found that the problem and pathological gamblers indicated a lower self-concept than the rest of the sample, and yielded higher rates of clinical depression; and results from Study I indicated higher rates of suicide ideology and suicide attempts .

Addictions are widespread amongst the adolescent community for numerous reasons. An addiction provides a solution for adolescents, providing a panacea for awkwardness, peers to share the experience with, a feeling of identity resulting from a place to go, to alleviate boredom, something to do, and an easy way to alter one's mood. And of utmost importance, addictive behavior provides a wonderful way by which adolescents can express rebellion against all authority and establish their sense of independence.

Beck and Emery (1977) advocate a biopsychosocial model, including understanding mental, emotional, spiritual, behavioral, and social components of an addiction. This model elaborates on Jacobs' 'emotional predisposition' to addiction. They propose that clinicians use such a model to guide their assessment and treatment strategies of addictions, emphasizing the need to address the underlying causes as well as the addictive behavior itself. A cognitive/behavioral approach to treatment will provide adolescents with tools which will help them develop an identity apart from gambling; a way of thinking that will result in making positive decisions; provide them with ways to cope with relapsing; how to achieve self-mastery through abstinence and behavior changes; and most important, a way to feel empowered in dealing with the development of difficulties during adolescence.

Limitations of the Three Studies

The limitations of the current research deserve mention. With respect to measures used, the indirect assessment of physiological resting state with use of paper-pencil inventories may be problematic. Despite the fact that the personality and behavioral 138

constructs assessed have been linked with their biological underpinnings, inferences made may not be accurate, and the results must be interpreted in this light. The use of direct physiological measurements with such a large sample seemed unjustified at the conception of the project. However, we believe that results obtained have provided sufficient motivation to include physiological measures of cortical arousal in future research investigating the issue of a physiological predisposition to addiction. In a similar light, Harter's Global Self-Worth subscale of the Self-Perception Profile for Children may not have been sufficiently comprehensive for assessing self-esteem. In addition, the evaluation of alcohol and drug consumption, as it was ascertained, does not permit conclusions as to whether abuse of the substances is occurring. A more comprehensive evaluation of comorbid addictive behaviors would have allowed for a more in-depth, general, evaluation of Jacobs' General Theory of Addictions.

Considering the small number of female problem and pathological gamblers in the current sample (N=12), generalizations concerning gender differences among problem and pathological gamblers should be considered as preliminary and tenuous at the present time. <u>The Need for Prevention of Juvenile Gambling Problems</u>

It is now time for social policy reform. Schools must play a meaningful role in not only informing youth about the dangers concerning excessive gambling, but in teaching adaptive coping strategies to deal with life's hardships. Parents, educators, and clinicians need to adopt the view that gambling is an addiction like all others, and that it should be given the same importance and priority with respect to prevention and treatment. Through the media, the public in general can be informed about the influence adults have in modeling gambling behavior. We are not proposing that gambling is immoral, nor are we preaching abstinence; but we do want to emphasize that for a certain minority of individuals (4% to 8%), it can result in devastating consequences. For those affected, it is important that treatment be made available to them. Considering the steadily increasing availability of gambling venues in today's communities across the world, we are expecting to see a steady increase in young problem and pathological gamblers. If the number of pathological gamblers continue to increase, more and more clinicians will need to acquire training and therapeutic skills for helping this population. An increase in funding for existing facilities and new treatment programs are necessary. Notwithstanding an increase in treatment programs, more research and funding must be channeled toward education and prevention.

Like other addictive activities, gambling is not for the young, and as such, should no longer be treated as a socially acceptable activity for children and adolescents. Laws restricting access to gambling venues to underage individuals must be adopted where none exist and strictly enforced where they do exist. We implore legislators, educators, and parents to take notice of this problem among children and adolescents and to develop a proactive response to the increasing number of juvenile problem and pathological gamblers.

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Appendix A

DSM-IV-J

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1)	Do you often find yourself thinking about gambling activities at odd times of the day and/or planning the next time you will play?							
	Yes	No						
2)	Do you find you n activities?	eed to spend more and more money on gambling						
	Yes	No						
3)	Do you become restless, tense, fed up, or bad tempered when the to cut down or stop gambling?							
	Yes	No						
4)	Do you ever gamb	ble as a way of escaping from problems?						
	Yes	No						
5)	After spending mo another day to try time)	oney on gambling activities do you play again and win your money back? (more than half the						
	Yes	No						
6)	Do you lie to you	r family or friends or hide how much you gamble?						
	Yes	No						
7)	In the past year had for bus or train fail	ave you spent your school dinner money, or money res, on gambling actives?						
	Yes	No						
7a)	In the past year has shoplifted, to gam	ave you stolen money from outside the family, or ble?						
	Yes	No						
8)	Have you fallen o because of your g	ut with members of your family, or close friends, ambling behavior?						
	Yes	No						
9)	In the past year, had money worry cause	ave you gone to someone for help with a serious sed by participation in gambling?						
	Yes	No						

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Appendix B

Gambling Questionnaire

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Please note that all information is confidential.

 Please check the following types of gambling (for money) you have done in the past 12 months. Please mark only one answer for each.

	never	less than once a week	once a week or more	
a)				play cards
b)	·		<u> </u>	bet on sports (i.e. sports pools) with friends
C)		<u> </u>		purchase sports lottery tickets
d)				purchase lottery tickets
e)				bet on video poker
f)				play bingo
g)				play slot machines
h)				wager on bowling, pool, or other games of skill
i)			<u></u>	gamble at the casino
j)		<u> </u>	<u></u>	another form of gambling not listed above Please list:
2)	How m	uch skill i	s needed to	o be a good gambler?
	1	2 3	4	5 6 7
	none			a lot
3)	How m	uch luck i	s needed to	be a good gambler?
	1	2 3	4	5 6 7
•	none			alot
4)	What is	s the largest	amount of	money you have ever bet in one day? \$
5)	What is	s the largest	amount of	f money you have ever won in one day?

• •

- 6) What is the largest amount of money you have ever lost in one day? \$_____
- 7) For the following items, read the statements and decide whether you are more like adolescents described on the left side of the statement or on the right side of the statement. Then decide whether the statement you have chosen is REALLY true of you, or just SORT OF TRUE.

Really S true for me fo	ort of true or me			Sort of true for me	Really true for me
	Some kids are unhappy with themselves	BUT	Other kids are pretty pleased with themselves		
	Some kids are happy with themselves as a person	y BUT	Other kids are often not happy with themselves		
	Some kids like the kind of person they are	BUT	Other kids often wish they were someone else		
	Some kids are happy being the way they are	y BUT	Other kids wish they were different		
	Some kids are not happy with the way they do a lot of things	BUT	Other kids thin the way they do things is fine		

8) Please check the following activities you have done in the <u>past 12 months</u>. Please mark only one answer for each.

	never	less than once a week	once a week or more	every day
a)				consume alcohol/beer
b)			<u> </u>	use "upper" drugs (speed, cocaine, ecstasy)
c)				use "downer" drugs (marijuana, hashish, tranquilizers)
d)				use hallucinatory drugs (acid, LSD)
e)				smoke cigarettes

••••

9)	Was your m an excessive	other (or gamble	stepmother) e	ver	-		yes		no
10)	Did your mo ever have a excess drug/	other (or problem alcohol o	stepmother) with consumption?		_		yes		no
11)	Was your fa ever an exce	ther (or s ssive gar	stepfather) nbler ?		-		yes		no
12)	Did your fat have a probl consumptior	her (or st em with n?	epfather) ever excess drug/al	cohol	_		yes		no
13) H	Have you ever problem?	sought p	rofessional hel yes	p for a dri 	nking, si no	noking	, drug	or gam	bling
	If yes, what t	ype of p	roblem?						-
14) H	lave you expension of age	rienced t	he loss of a pai	rent due to	o separati	on, los	s, or de	eath bef	ore
		<u> </u>	_yes		no				
15) E	Do you have an	y legal a	ctions pending	against ye	ou?				
			_yes		no				
16) H	lave you ever	thought a	about attemptin	g suicide?	•				
			yes		no				
17) F	łave you ever a	attempted	d suicide?						
			_yes		no				
18)	In general, how	v would	you rate your s	elf-esteen	1?				
	1	2	3	·	4	5	-		
WO	rse than		about the san	ne		better (han		
mo	st people		as most peop	ple	1	most pe	eople		
my	/ age		my age			my a	ge		

· . · . · .

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19) In general, how would you rate your present happiness level?

1	2	3	4	5
worse than		about the same		better than
most people		as most people		most people
my age		my age		my age

20) In general, how would you rate your happiness during your preschool and elementary school years?

1	2	3	4	5
worse than	-	about the same		better than
most people		as most people		most people
my age		my age		my age

IF YOU HAVE NOT GAMBLED AT ALL IN THE PAST TWELVE MONTHS, AND HAVE ANSWERED "NEVER" TO ALL CATEGORIES IN QUESTION #1, YOU ARE FINISHED.

21) If you have gone, or continue to go to the casino, please indicate the approximate **percentage** (%) of time spent gambling on the following games. Please note that the total must equal 100%.

	blackjack	_%	roulette		_%		
	craps	_%	slots		_%		
	baccarat	_%	keno	<u> </u>	_%		
	other	_% please spec	cify				-
22)	When you gamble, w answer)	ho do you gamł	ole with? (Yo	ou can have	e more t	han one	
	alone my friends strangers		my my othe	parents brother or er relatives	sister		
23)	Where do you gamble at home at friends in arcades in bars in depanneurs	e? (You can hav	e more than at so at w in c bing othe	one answe chool vork asinos go halls er (please	r) specify)		
24)	Do you ever gamble r	nore than you w	vant to?	<u> </u>	yes		no
25)	Have you ever borrow	ved money to g	amble?		yes		no
26)	Have you ever stolen	money to gamb	le?	<u> </u>	yes	<u> </u>	no

. .



____yes ____

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• · ·

no

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37) When you gamble, how often do you go back another day to win back money you lost?

______never ______some of the time (less than half the times you lost) ______most of the time (more than half the time you lost) ______all the time
38) When gambling:
never rarely occasionally all the time

a.	Do you go into a trance-like state?	 	 ; <u></u> ;
b.	Do you feel like a different person?	 	
c.	Do you experience blackouts?	 	 ··
d.	Do you lose track of time?	 	
e.	Do you feel as though you're "outside" yourself, or "watching yourself"?	 	

All information is highly confidential. Thank you.

Appendix C

HSPQ Trait Descriptions

The theoretical constructs underlying the personality factors are described below to permit the reader a better understanding of the results. The descriptions of the factors represent the extremes of the continuums on which they lie, with the average adolescent falling somewhere toward the middle. The descriptions provided were obtained from the HSPQ Manual and Norms book (Cattell, Cattell, & Johns, 1984, pp. 11-18).

Factor A: Warmth

Factor A represents a continuum from warmth (A+) to coolness (A-) as a personality trait. Adolescents high on this trait are generally outgoing, kindly, easy-going, soft-hearted, trustful, and appear to enjoy other people. The adolescents low on this trait are hard to approach, objective, aloof, critical, distrustful, skeptical, objective, and stand by their own ideas. The primary element that distinguishes A+ from A-people is affect. A+ individuals are very expressive whereas A- people demonstrate little affect. Factor B: Intelligence

Factor B represents a continuum from abstract to concrete thinking. The B+ adolescent tends to be more intelligent, insightful, fast learning, and intellectually adaptable whereas the B- individual is unable to successfully handle abstract problems and has a low mental capacity. As Terman's (1959) research indicated, the B+ adolescent is more popular with peers as a work partner, well adjusted in the schooling environment, a leader, and less likely to join deviant or delinquent groups of people. This factor is not a measure of overall cognitive functioning and should not interpreted as such.

Factor C: Emotional Stability

Factor C is concerned with emotionally stability (C+) vs. easily affected by feelings (C-). This construct reflects the level of emotional control and stability, as opposed to uncontrolled, disorganized, general emotionality. In its positive sense, it appears to be a measure of what psychoanalysts term "ego strength". This trait does not appear to be solely dependent upon learned components, but rather seems to have constitutional tendencies which make the acquisition of emotional control either easier or harder for some. Factor C is directly related to an individuals capacity for frustration tolerance. C+ adolescents tend to be emotionally mature, calm, adjusts well to facts, and do not let emotional needs obscure the realities of a situation. C- adolescents are easily annoyed by things and people, are in general unhappy with their family and school, have difficulty keeping quiet and restraining themselves, are easily perturbed, are argumentative, and get into fights and problem situations. A low Factor C is the most general pathological indicator in the HSPQ profile, being found in neurotics, psychotics, alcoholics, and drug addicts.

Factor D: Excitability

Factor D represents a continuum from excitable (D+) to phlegmatic (D-). D+ individuals tend to be impatient, overactive, demanding, impulsive, and easily distracted. Delinquents are usually high on Factor D. These descriptions are not unlike characteristics common to Attention Deficit Hyperactivity Disorder. Adolescents low on Factor D are, in general, undemonstrative, placid, inactive, deliberate, and stoical.

Factor E: Dominance

Factor E represents a continuum extending from dominant to submissive personality types. Adolescents high on factor E are assertive, aggressive, competitive, self-assured, unconventional, and rebellious. E-individuals tend to be more humble, mild, easily led, dependent, and diplomatic. The trait of dominance is more prevalent in leaders than followers. Both extremes of Factor E pose problems for adjustment. High scores are often part of a delinquent pattern, but very low scores are equally disturbing, often occurring in profiles of neurotic individuals.

Factor F: Cheerfulness

Factor F represents a relatively fixed trait, of cheerful, happy-go-lucky lightheartedness at the F+ pole, and seriousness, caution, and subdueness at the F- pole. Adolescents high on Factor F tend to be more talkative, honest, expressive and alert.

Factor G: Conformity

This factors assesses the regard for group moral standards. Adolescents on the high side of this factor tend to be conscientious, persistent, moralistic, rule-bound, and responsible. In contrast, those scoring below average on this trait are more likely to disregard rules, be self-indulgent, and undependable. High scores, among typical High School groups, correlate positively with academic achievement, interest in school and peers, popularity, and election to leadership. Conversely, institutionalized delinquents score below average on this factor and increase on this trait as they improve on adjustment (Pierson, Moseley, & Olsen, 1967).

Factor H: Boldness

This factor represents a continuum ranging from shyness to boldness. Adolescents high on this factor tend to be uninhibited, adventurous, carefree, and impulsive. While individuals scoring low on this trait report themselves to be intensely shy, slow, inhibited, and dislike occupations with personal contact. **Factor 1: Sensitivity**

Sensitivity represents a continuum ranging from "tough minded" to "tender-minded". Adolescents scoring high on this trait are very sensitive, insecure individuals who expect attention and affection from others. They are reported to be overprotected, artistically inclined, and indulgent towards themselves and others. Individuals low on this factors tend to be more tough, practical, mature, unsentimental, and self-reliant.

Factor J: Withdrawal

This factor represents a continuum ranging from vigorous (J-) to withdrawn (J+). Individuals high on this factor describe themselves as having personal views which differ from the group, and prefer to keep in the background to avoid arguments. These individuals acknowledge that they have fewer friends, and are generally unpopular with other students. As well, they tend to guard themselves internally. Those low on this factor are more rigorous, like to blend in with the group, and like attention.

Factor O: Apprehension

This factor represents a continuum ranging from self-assured (O-) to apprehensive (O+). O+ adolescents are self-blaming, guilt-prone, insecure, and tend to worry and be anxious. They are overly sensitive to the approval or disapproval of others, and cry easily. In contrast, those low on this trait tend to be secure, guilt-free, untroubled, and self-satisfied. They are resilient individuals, who do not rely upon the opinions of others.

Factor O2: Self-Sufficiency

"Group-oriented" (Q₂-) to "self-sufficient" (Q₂+) are measured within this factor. Q₂+ adolescents are resourceful and accustomed to making their own decisions while Q₂- people show a tendency toward conformity, go along with the group, strongly value social approval, and are conventional and fashionable. Q₂+ students are reported to have older friends and mature interests, and may separate themselves from the crowd.

Factor O3: Self-Discipline

Adolescents high on Q3 are self-controlled, self-respecting, remain anxious to do well, are concerned with their social image, and are considerate of others. They are disposed to control and reduce the expression of emotions, and are the type to be chosen as leaders. At the Q3- pole, adolescents demonstrate an unreflective emotionality as well as a narcissistic rejection of cultural demands. They are more lax, uncontrolled, and led by their own urges. Furthermore, a low score on Q3 is associated with adolescent delinquency. Research (Cattell, Blewett & Beloff, 1955) has established that the expression of this trait is not entirely environmentally determined and may represent temperamental dispositions.

Factor O4: Tension

Factor Q4 represents a continuum from relaxed to tense. Adolescents scoring high on this trait describe themselves as often irrationally worried, tense, irritable, and in turmoil. They feel easily frustrated and are sensitively aware of being criticized by others, especially by their parents. Q4+ individuals tend to have a higher drive than Q4- adolescents. Those low on this trait tend to be tranquil and composed.

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