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Boys' Biopsychosocial Difficulties during the Teenage Years

Canadian State of Affairs for the
21st Century

Discussion Paper

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About this Report

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Boys' Biopsychosocial Difficulties during the Teenage Years

Canadian State of Affairs for the 21st Century

This report was jointly written by Eric Lacourse, Ph.D., and Paul L. Gendreau, Ph.D., of the University of Montréal.

Abstract

This paper provides a comprehensive review and synthesis of existing research on trends, prevalence and influences of risky social behaviours during adolescence, focusing specifically on the situation of young males in Canada.

It examines four developmental outcomes of concern in male adolescents: delinquency, dropping-out of high school, drug use/abuse and depression/suicide; the "4 D's" of male adolescence biopsychosocial difficulties.

An integrated framework linking individual and environmental risk factors is used for explaining adolescence difficulties and outcomes. These outcomes are seen as a probabilistic, not deterministic, developmental process. Emphasis is placed on the interactive effect of individual characteristics and social context (family, school and community) at different stages of development and youth transitions. The paper also examines available evidence on most effective practices and approaches to prevent and reduce the likelihood of risky behaviours during adolescence and concludes with a discussion on future policy and research priorities to support investments in the well-being of individuals and society through a focus on youth, family and community networks.

Résumé

Ce rapport présente un examen approfondi ainsi qu'une synthèse de la recherche actuelle sur les tendances, la

prévalence et les influences des comportements sociaux à risque durant l'adolescence, et est axée principalement sur la situation des jeunes hommes au Canada.

Les auteurs y examinent quatre résultats préoccupants quant au développement des garçons à l'adolescence : la délinquance, l'abandon de l'école secondaire, la consommation de drogues ou la toxicomanie et la dépression ou le suicide; en anglais, les « 4 D » (delinquency, dropping out, drug abuse, depression) des difficultés biopsychosociales de l'adolescent.

Le document utilise un cadre intégré qui lie les facteurs de risque individuels et environnementaux pour expliquer les difficultés et les résultats relatifs à l'adolescence. Ces résultats sont considérés comme un processus de développement probabiliste plutôt que déterministe. L'accent porte sur l'effet interactif des caractéristiques individuelles et du contexte social (famille, école et collectivité) à diverses étapes du développement et aux moments de transition du garçon. Les auteurs examinent également la documentation existant sur les pratiques et les démarches les plus efficaces pour prévenir et réduire la probabilité des comportements risqués au cours de l'adolescence et concluent par une discussion sur les futures priorités en matière de politiques et de recherche en vue d'appuyer l'investissement dans le bien-être des personnes et de la société, en mettant l'accent sur les jeunes, les familles et les réseaux communautaires.

I. Introduction

Boys do not seem to do as well as girls these days. Indeed, a host of opinions, editorials, popular books, and media reports have recently called attention to the underperformance of boys in school, their higher drop out rates and their lower participation in higher education. The media turmoil may have culminated with the January 30, 2006 issue of *Newsweek*, which bore the title "The trouble with boys" on the front page. Are boys falling behind girls as the media tend to portray and are they academically less engaged and less committed to school than girls? Or is this simply a bandwagon effect that over-emphasized relatively minute differences, perhaps supported by a popular bias to think that new generations are doing worse than previous ones?

Gender differences in behaviour have been well documented. A higher incidence of physical

aggression and violence has been reported in boys and more boys than girls are being diagnosed with attention deficit and hyperactivity disorder (ADHD), oppositional defiant disorder (ODD) and conduct disorder (CD). Autism and other pervasive developmental disorders are also more prevalent in boys.

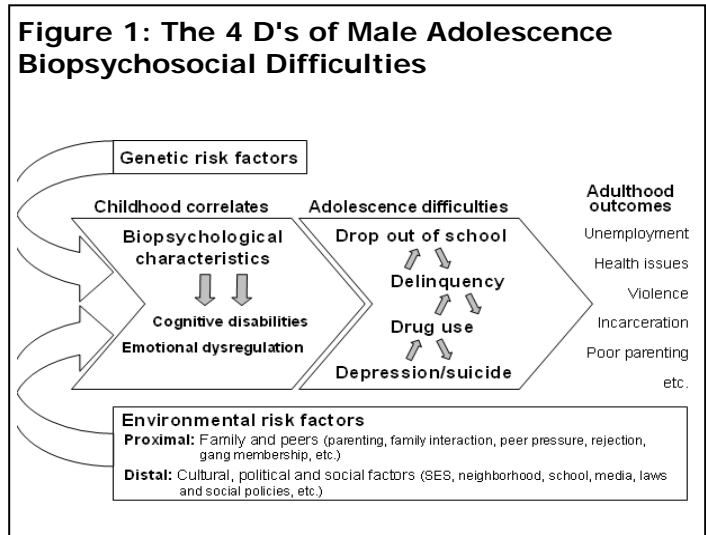
During adolescence and adulthood, delinquency and criminal behaviour, suicide, licit and illicit substance use and abuse, as well as other forms of addiction such as gambling, are more frequently observed in males than in females. The body of research that addresses the topic of gender in relation to behaviour and social adaptation is quite diversified and multidisciplinary and includes a variety of comparisons and analyses at discrete but interconnected levels, from biological organization to socialization issues.

The goal of the present work is to identify male distinctiveness in psychosocial development and adaptation. Our theoretical framework is based on an ecological developmental perspective that targets individual differences and similarities, with an emphasis on risk factors, that is, factors or variables that alter the probability for each individual of taking a particular developmental pathway. Cognitive, emotional, and social behaviours are the product of a complex and dynamic interaction between genetic and environmental factors. These primary raw forces influence development via alterations in biological organization and function. Furthermore, genetic and environmental factors exert their effect differentially through each developmental period and transition, from pregnancy to adulthood, generating variation between individuals and, therefore, individuality. This biopsychosocial approach to individual development is the core of this report. Our report aims to understand four major potential developmental outcomes or concerns in male adolescents:

- 1) delinquency,
- 2) drug use and abuse,
- 3) dropping out of school, and
- 4) depression and suicide.

We refer to these developmental outcomes as the four 'D's of adolescence psychosocial difficulties (see Figure 1).

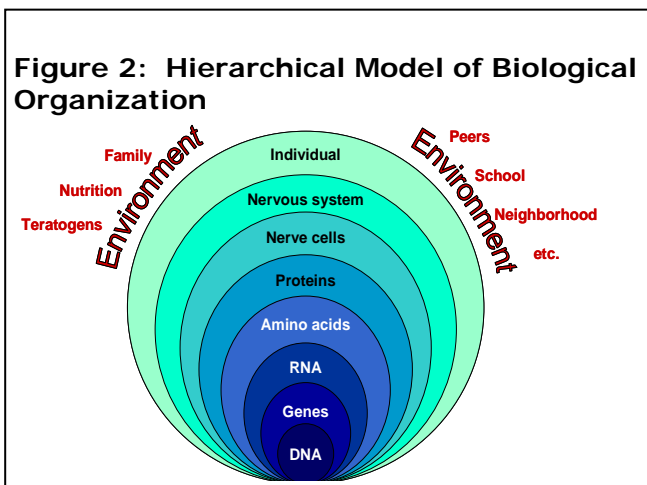
Our report aims to understand four major potential developmental outcomes or concerns in male adolescents: delinquency, drug use and abuse, dropping out of school, and depression and suicide.



II. A Probabilistic Biopsychosocial Approach to Behavioural Development

Behavioural phenomena such as delinquency, drug use, school drop-out, depression and suicide cannot be linked to a unique genetic or environmental cause. To understand the etiology of these complex outcomes, it is necessary to adopt a biopsychosocial and transactional perspective that encompasses multiple levels of interrelated influences during development, as described in the following principles:

a) Behavioural development is shaped by a dynamic and continuous interaction between the individual and the environment. Individual differences are the product of discrepancies in biology, which is the result of gene-environment interactions and personal experience within complex historic and sociocultural contexts.



Development results from an interaction between multiple levels of biological organization and multiple stratified environmental levels. According to the what has been called the central dogma of molecular biology (Keller, 2000), genes are "merely" functional units of our DNA (deoxyribonucleic acid) that code for proteins through a RNA (ribonucleic acid) transcription process. Proteins, which are produced from RNA via amino acids, are the building blocks for all living cells, including brain cells (neurons and glia). The nervous system comprises more than 100 billion neurons and 10 to 50 times more glial cells. Both cell types team up during development to produce a unique network of neuronal connections and interactions and, therefore, a unique brain and a unique individual. This is a complex hierarchical organization of biological structures and functions (Figure 2), with genes being "turned on or turned off" due to interactions at and between each structural or functional unit. Therefore, environmental factors, such as nutritional factors and teratogens such as exposure to lead, alcohol or tobacco smoke during pregnancy, parental behaviour, family interactions, and peer relations during childhood and adolescence, as well as school climate, quality of neighbourhood and social policies may influence biological structures and functions, from gene expression to brain networking or learning.

There are obvious neurobiological differences between males and females. Boys' brains are

about nine percent larger than girls' brains, even after controlling for height and weight (Giedd, 2004). Differences are still observed in adulthood, with male neocortex containing on average 21 percent more neurons than the female neocortex (Pakkenberg and Gundersen, 1997). Yet there is no evidence that these size differences provide any functional advantage to males. On the other hand, brain development is slower in boys, with amount of gray matter, which contains neuron cell bodies, reaching a peak at 12 years of age, one year after girls on average (Giedd, 2004). Furthermore, total brain volume reaches a peak at 14.5 years of age in boys and at 11.5 years in girls. This is a significant neurodevelopmental gap that may explain some of the gender disparity in cognitive, affective and behavioural development during adolescence. Girls are often described to be more socially mature than boys at the same age. It is important to stress, however, that differences between genders during early childhood and adulthood are not as pronounced as intra-gender variations.

It is important to stress, however, that differences between genders during early childhood and adulthood are not as pronounced as intra-gender variations.

b) Behavioural development follows a probabilistic, not a deterministic, pathway.

Genes do not determine behaviour; nor does environment. In medical and developmental sciences, as well as in genetics, the notion of "risk" or "risk factor" has been traditionally used to qualify the probabilistic nature of expressing a specific physical, mental or behavioural condition. Some people may be more genetically or environmentally at risk of negative outcomes than others. In developmental psychology, risk can be categorized into distal or proximal factors. Distal risk factors include genetic and environmental influences such as experience and education, and involve a continuous developmental process that begins at fertilization (even before, in fact, if we consider that gametes are influenced by their genes and environment). Proximal risk factors include neurophysiological

variables such as mind state and intoxication. It also includes contextual factors; those are the circumstances in which it happens. For instance, displaying aggression in the classroom may be linked to being in a "bad mood" and by being pushed, voluntarily or involuntarily, by a peer. The aggressor may have been raised in a family characterized by dysfunctional parenting and social adversity or may have some hereditary or biological predisposition to react impulsively (Gendreau and Archer, 2005). Conversely, factors that are linked to better outcomes are said to be "protective". However, protective factors are not necessarily the opposite of risk factors. For example, the impact of a "risky" gene on development may be offset by the presence of a "protective" gene that, by itself, does not confer any other developmental advantage. Similarly, ADHD may be considered to be a risk factor for conduct disorder, but it would make no sense to argue that the absence of this disorder is a protective factor. It is worth pointing out that, given the high comorbidity of these disorders, one can assume that both ADHD and conduct disorder share common causal factors. If this is the case, then ADHD is merely a "risk indicator", that is, a correlate of conduct disorder that does not involve causation (Rutter, 2003; 2006).

Risk and protective factors are determined using a population approach, reflecting a main effect for a group or subgroup of individuals. Statistically, these effects can be significant due to the use of a large population to draw inference, but still relatively unimportant, by having only a weak correlational value, that is, a low effect size. In behavioural sciences, referring to population data to predict individual development must be exercised with caution, not only because of the statistical gap between population versus individual thinking, but also because the effects of individual and environmental factors are not simply additive; rather, they interact synergistically, making prediction a hazardous endeavour. Furthermore, risk factors may operate differently at different time points or developmental periods. There have been recent attempts to go beyond the risk factor model for explaining behavioural development, particularly for aggression and antisocial behaviour. For

example, Lahey, Waldman, and McBurnett (1999) suggested a causal model to explain the appearance of antisocial behaviour in children and adolescents, whereas Moffitt (2005) essentially claimed that referring to risk and protective factors represents a failure for developmental science that can be resolved by controlling for gene-environment interactions. The notion of risk factor remains a valuable and indispensable tool for developmental theories; however there is clearly a need to present integrated models that extend beyond the listing of risk factors.

Most people exposed to a specific risk factor do not develop a physical or mental disorder and a risk factor is not a sufficient or necessary condition for a disorder to emerge. Moreover, given that a risk factor in one situation can become a protective factor in another, Rutter (1993; 2006) suggested a focus on risk mechanisms or processes instead of risk factors per se. For instance, it is well documented that males are more likely to take a developmental pathway leading to school drop out, delinquency, drug use, and abuse, or to commit suicide. The fundamental scientific objective is to identify the developmental process by which the fact of being male biases or moderates the probability of exhibiting these outcomes by looking at different levels of biological and social organization and the interaction between these levels.

Most people exposed to a specific risk factor do not develop a physical or mental disorder and a risk factor is not a sufficient or necessary condition for a disorder to emerge.

c) Individuals differ in their ability and capacity to withstand developmental challenges. They exhibit different levels of vulnerability and resilience.

Psychological and behavioural outcomes are constructed through time and experience and are marked by continuities and discontinuities, by a series of transitions from early childhood to adulthood and by the presence or absence of risk and protective factors. These factors may exert

their action at specific periods of development such as relational break-up, or throughout a longer period of time, as with child abuse or low socioeconomic status. The ability to resist risk factors or to respond to protective factors as well as the ability to negotiate developmental transitions varies among individuals. Although this seems to imply an intrinsic trait, resilience and vulnerability to adversity are features that fluctuate through time and developmental periods. They may also be specific to situations and contexts. Therefore, resilience is more a dynamic process than a stable individual trait, and its study requires assessment at different time points and in response to multiple risk factors. In addition, if an adolescent appears resilient to adversity by not exhibiting delinquent behaviour, for instance, it might be at the "price" of showing depressive or anxious symptoms (Rutter, 1993). Unfortunately, such internalizing behavioural problems may lead to extreme forms of psychosocial manifestations, particularly in males, that is, aggression toward others and themselves or suicide, due to the higher levels of impulsivity generally observed in males. Examining what determines or influences resilience in both males and females may provide us with cues for prevention and intervention programs adapted to each gender.

Examining what determines or influences resilience in both males and females may provide us with cues for prevention and intervention programs adapted to each gender.

d) Each developmental period has its own specific "windows of opportunity". Though brain plasticity, the biological basis of learning, diminishes through aging, opportunities for influence continue throughout life span within complex social networks and politics.

The "zero to three" period, a particularly important, almost critical, developmental period, has been a recent focal point for research. Despite the high significance of this period on brain and behaviour development, we agree with the statement that "the disproportionate attention

[to this period] begins too late and ends too soon" (Shonkoff and Phillips, 2000, p. 7). Indeed, the development of the brain and, therefore, behaviour is set in motion soon after fertilization. More or less 100 billion neurons will be produced during pregnancy, with peak of production reaching, at some point, 250 000 neurons per minute. Neurons then migrate and differentiate to form, at birth, a very incomplete brain.

Approximately 75 percent of brain volume is attained after birth, due mainly to extensive axonal myelinisation by glial cells. And, although total brain volume is about 95 percent of its adult size by the age of six years, some parts of the neocortex still undergo significant changes during adolescence and adulthood (Giedd, 2004; Giedd et al., 1999). Therefore, not only brain development can be influenced by environmental, that is, nutritional or teratogenic, factors during the prenatal period, but synaptogenesis, the formation of synaptic links between neurons, and the regulation of neuronal structures are open to other forms of environmental influences such as social or cultural ones, for a much longer period of time, in reality throughout the life span (Rice and Barone, 2000). Such postnatal brain plasticity, despite declining with age, still provides the individual with a potential to learn new behavioural strategies and to react or adapt to his or her social world. This is a fundamental concept in developmental neuroscience. It is also a valuable notion for clinicians, particularly those helping adolescents and adults to get back onto a pathway toward well-being and greater physical and mental health satisfactory to both the individual and society.

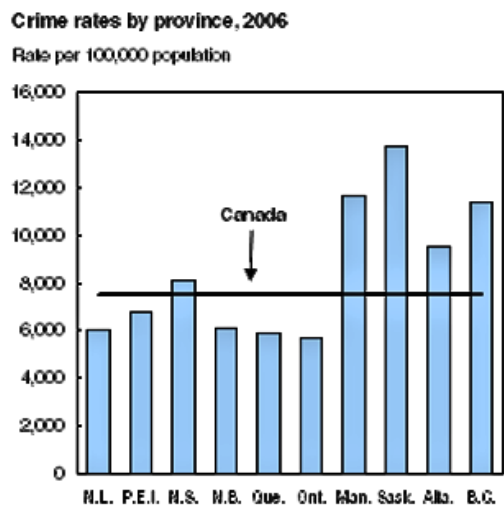
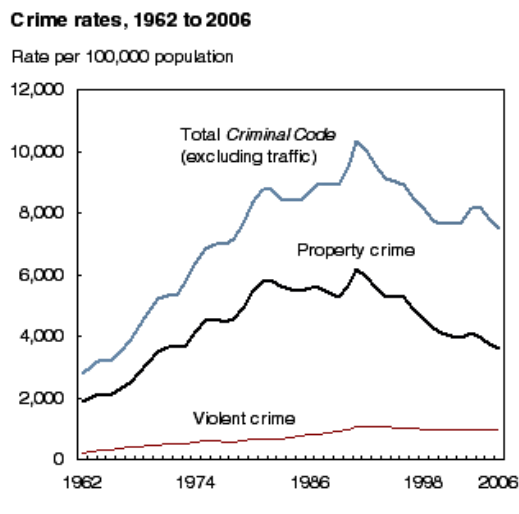
III. The Four D's of Male Adolescence Difficulties: Trends and Prevalence

Delinquency

Criminal and violent behaviours have been a preoccupation of all societies since the beginning of time. Males account for the large part of conviction statistics and most severe acts of violence. Research on the history of crime in the Occident has provided a better understanding of

Figure 3: Canadian Trend in Crime Rates and Crime Rates by Province

(Statistics Canada, 2007)



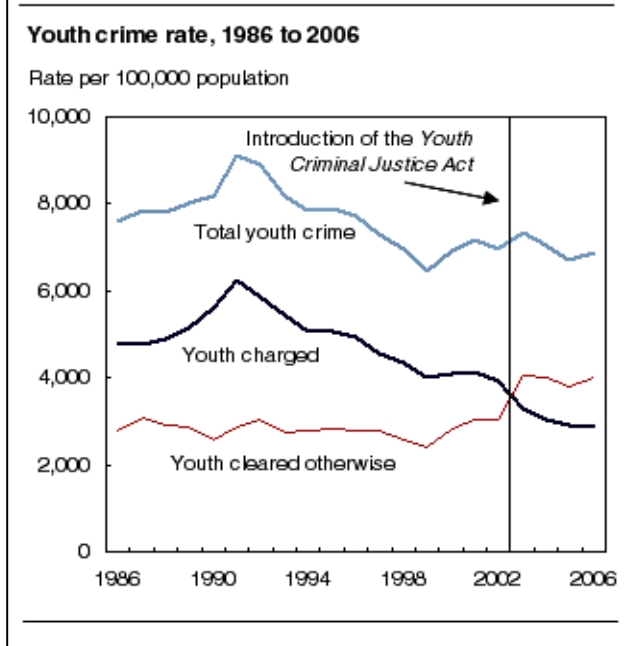
long-term trends in violence. Overall, there has been a strong decrease in serious interpersonal violence from the mid-sixteenth to the twentieth century (Eisner, 2001). This important decline is due to the substantial reduction in elite violence, homicide and vendetta. Civilizing processes such as laws, and the strengthening of state powers, combined with modern individualism are likely accountable for this decline. Criminality and violence have waxed and waned in Canada and United States during the last century, with a noticeable drop in homicide rates from 1990 to recent years. What generally differs between Canada and United States is the lethality of crimes. This can be chiefly explained by the proportion of gun ownership in the two countries. The overall crime rate in Canada has decreased by 30 percent since 1991 when rates were at the highest (see Figure 3). A three percent drop in overall crimes was observed in 2006 compared to 2005 (Statistics Canada, 2007). Nevertheless, the rate of violent crime remained relatively stable despite a 10 percent reduction in homicide in 2006 compared to 2005. Last year, crime rates were higher in the western provinces, with Saskatchewan, Manitoba, British Columbia, and Alberta reporting the highest overall rates, approximately two times higher than rates in Ontario and Quebec. The trend in criminality is relatively similar among teens aged 12 to 17 (see Figure 4), although an overall increase of three

percent was reported in 2006 compared to 2005, including a three percent rise in violent crime. Youth crime rates increased in all provinces except Quebec, where a drop of four percent was reported.

Youth between the ages of 15 and 24 are the most at risk for perpetrating crime (Gottfredson and Hirschi, 1990; Moffitt, 1993). For violent crimes, the spectrum of age is extended to adulthood (Lacourse, Dupéré, and Loeber, *in press*). What appears to be particularly alarming is that teens and young adults are involved in more serious crimes. Moreover, criminal behaviours are initiated at an earlier age compared to observations at the beginning of the century (Winterdyk, 2005). The rate of violent crimes among young males has been recently declining, however there has been a slight increase among girls (Winterdyk, 2005).

What appears to be particularly alarming is that teens and young adults are involved in more serious crimes. Moreover, criminal behaviours are initiated at an earlier age compared to observations at the beginning of the century (Winterdyk, 2005).

Figure 4: Canadian Trend in Youth Crime Rate (Statistics Canada, 2007)



Two trends have been noted in recent years: street gangs and child bullying. Street gangs have been linked to drug dealing, weapon trafficking and prostitution and have been portrayed by the media as groups of individuals committing impulsive, random acts of violence. Concerns about gangs appear to be recurring and often spark during arrests of adult gang members. Although the phenomenon of street gangs is not new, there are relatively few Canadian studies on this issue. Fortunately, the problem of gangs in Canada is not as widespread as in the United States. A recent study indicates that approximately seven percent of Canadian teens in their mid-adolescence are gang members (Dupéré et al., in press). Gang members are responsible for most property and serious violent youth crimes. Bullying has also been an important media topic in recent years as 19 percent of boys and four percent of girls can be described as bullies (Pepler, Jiang, Craig, and Connolly, 2004). The psychological impact of bullying can be quite severe and can even lead to suicide. This topic of research is relatively new. Long-term trends in patterns and risk factors still need to be identified and described.

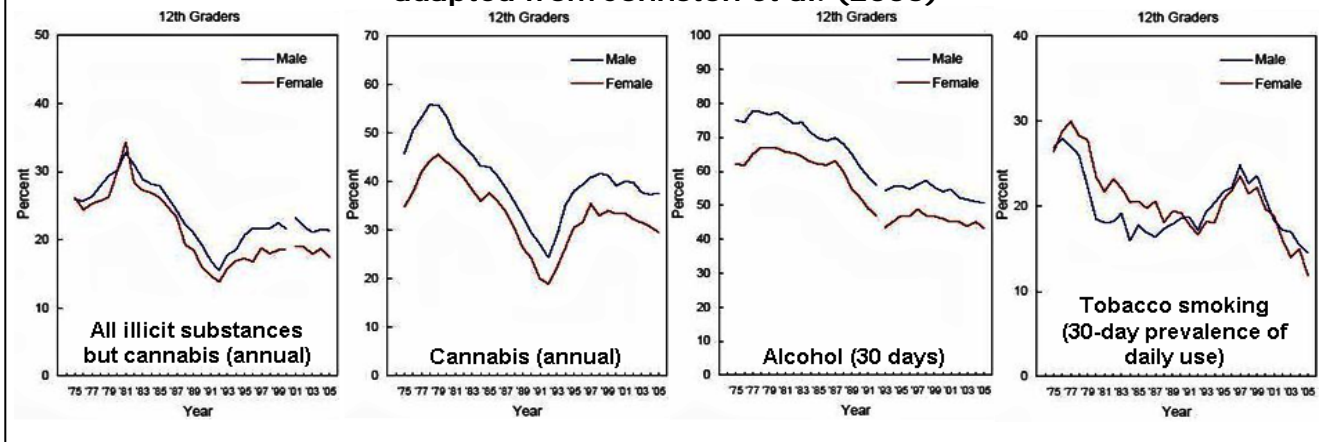
Some subpopulations are more at risk of being involved in crime. Crime is problematic in large

US cities, particularly in neighbourhoods characterized by poverty, racial segregation and social exclusion. These social conditions are the perfect setting for the establishment of street gangs, including recruitment of new gang members. The impact of these social inequalities is also felt in Canada, particularly affecting Canadians of black and First Nations origin. Canadian males of African and Caribbean origin are over-represented in prisons, a situation reminiscent of what is observed in the USA. In addition, rates of violence and criminality are extremely high in First Nations communities. Such violence has significant repercussions on the health and well-being of First Nations people, both males and females. For instance, one report indicated that First Nations residents in Alberta were 6.75 times more likely to be taken to the emergency department for injury caused by violent, non self-inflicted behaviour than non-First Nations people; similar odds were reported for suicide and self-inflicted injury (Alberta Centre for Injury Control and Research, 2005).

Drug Use and Abuse

It is difficult to establish the secular trend in prevalence of illicit drug use due to a paucity of long-term longitudinal or cross-sectional surveys. In addition, prevalence of drug use and drug-related issues may be under-reported in questionnaires or telephone interviews. Despite these shortcomings, one of the most important surveys monitoring use of licit and illicit substances among American adolescents began in 1975 (Monitoring the Future). As shown in Figure 5, a sharp decline in drug use has been observed in 12th graders from 1979 to 1992, followed by a rather steep increase in the following six years (Johnston, O'Malley, Bachman, and Schulenberg, 2006). Since 1998, teen drug use has declined for almost all drugs, other than relatively novel prescription drugs, opioids or pain killers such as OxyContin and Vicodin (Johnston et al., 2006). Significant reduction in alcohol intake and tobacco smoking has also been noted in US high schoolers, although the decline in smoking came to a stop in 2006.

Figure 5: Trends in prevalence of illicit and licit substance use in US 12th graders, adapted from Johnston et al. (2006)

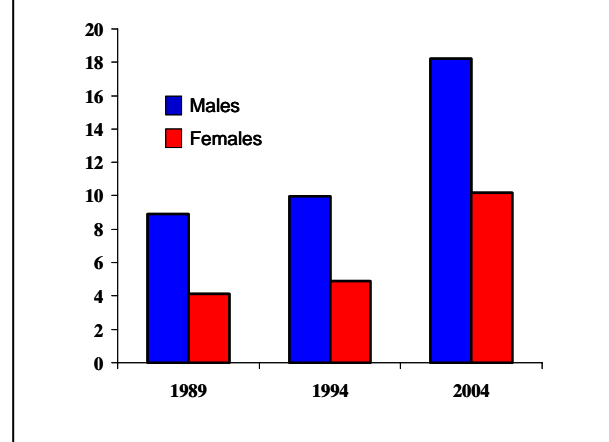


Historically, prevalence rates of drug use, drug abuse and drug dependence have been considerably higher in men than in women, and the male-to-female ratios are generally larger for illicit drugs and alcohol than for tobacco. US boys more frequently use most illicit drugs of abuse, including cannabis, heroin, cocaine, hallucinogens such as LSD, barbiturates such as sedatives and tranquilizers, and steroids. There are lesser or no gender differences in the use of ecstasy, amphetamine and methamphetamine (Johnston et al., 2006). In Europe, more women than men seem to use tranquilizers and sedatives (European Monitoring Center for Drugs and Drug Addiction, 2005).

Cannabis is the most frequently used illicit drug in the world. In Canada, 18 percent of men and 10 percent of women aged 15 and older reported use of this substance in the 12 months preceding the 2004 survey (Adlaf, Bégin, and Sawka, 2005, see Figure 6). This represents a significant increase from 1994 to 2004 in both males, at 82 percent, and females, at 114 percent. Increases in cocaine or crack and speed have also been noticed but 2004 prevalence remains below three percent in males and one percent in females. For other substances such as tobacco, there are marked differences among countries, with higher male to female ratios in eastern countries than in Western Europe and North America. The prevalence of smoking in women is increasing in developing countries (Mackay and Eriksen, 2002). In Canada, smoking has been decreasing steadily since 1994 (Health Canada, 2005).

However, prevalence of smoking remains higher in males in all age groups, and males systematically report smoking more cigarettes. Alcohol is the psychoactive substance of choice, especially among males. Approximately nine percent of Canadian men reported drinking five or more drinks at least once a week whereas 30 percent reported having exceeded the low risk guidelines, for males 14 drinks per week and for females nine drinks per week, compared to three percent and 15 percent respectively in women (Adlaf et al., 2005).

Figure 6: Annual Cannabis Use (%) among Canadians, Aged 15+ (Adlaf et al., 2005)

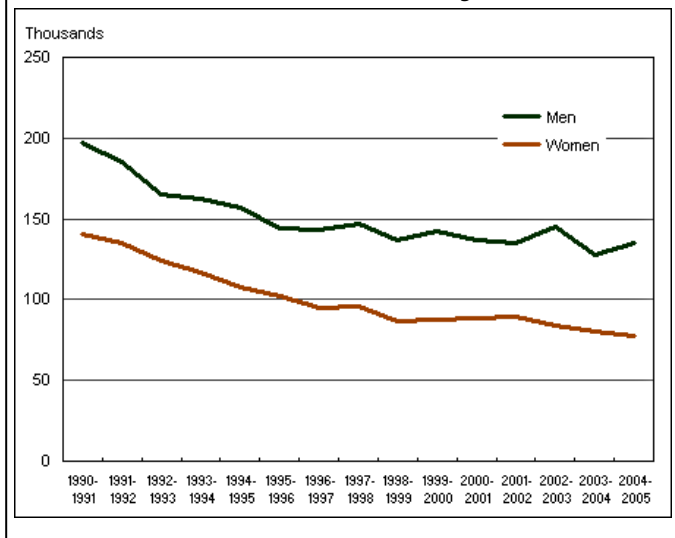


Dropping Out of School

As presented in Bowlby's (2005) research report (Labour Force Survey), there has been a progressive reduction in high school drop-out rates among Canadian youth. This reduction was observed from the west coast to the east coast, but was more robust in the Atlantic Provinces. In 2005, British Columbia had the lowest rate of school drop-out, at seven percent, whereas Manitoba had the highest, at 13 percent. Higher rates of school drop-out are still being observed in rural areas and small towns. Overall, from 1990 to 2005, high school drop-out declined by approximately 30 percent in boys and 50 percent in girls, with the risk of drop-out in boys 1.7 times higher in 2005, 12.2 percent versus 7.2 percent for girls. For 20 to 24 year-olds who did not complete high school, the male to female ratio is more pronounced in Quebec, reaching 2.3. Overall, in Canada, men account for 64 percent of all school drop-outs in 2005, a higher proportion than the 58 percent found in 1990. This increase is the result of the sharper decline over the years in women. All in all, men are doing better than 15 years ago but not as well as women (see Figure 7). Similar conclusions have been reached in academic performance in the US, with boys doing increasingly better over the years but girls showing the greatest overall improvement (Perie, Moran, and Lutkus, 2005). Gender differences in academic achievement also exist in higher levels of education. For instance, not only was the ratio of men to women at the university reduced over the last few years, but men's share of enrolment decreased from 47 percent in 1992-93 to 42 percent in 2001-2002 at the undergraduate level, and from 58 percent to 51 percent at graduate levels. During the same period, graduation was reduced by one percent in men and increased by 10 percent in women (Canadian Education Statistics Council, 2006). Graduation rates for males were higher in physical, natural and applied sciences, and lower in the humanities and social sciences.

Overall, in Canada, men account for 64 percent of all school drop-outs in 2005, a higher proportion than the 58 percent found in 1990.

Figure 7: Trend in High School Drop-out in Men and Women (from Bowlby, 2005)



Depression and Suicide

Depression is one, if not the most, significant mental health problem affecting the population of industrialized countries and the second greatest cause of Disability Adjusted Life Years (DALY). This measure extends the concept of potential years of life lost due to premature death by including equivalent years of "healthy" life lost due to being in a state of poor health or disability. Few studies have investigated the prevalence of depression in Canadian youth. The first studies, the Ontario Child Health Study and Ontario Mental Health supplement, were done more than 20 years ago. Annual prevalence ranged from 2.7 percent to 7.8 percent for children and adolescents aged from 6 to 18 years (Fleming et al., 1989; Offord et al., 1996). In three recent studies investigating depression and suicidality, that is, suicidal ideation and attempt, among Canadians, it was noted that girls were two to three times more likely to suffer from depression and suicidality than boys (Cheung and Dewa, 2006). These gender differences are particularly robust among First Nations and rural communities in Canada, a trend also observed in the United States and UK. The gender gap in depression tends to appear in early adolescence, stabilize in adulthood and decline in older age. Explanations for these gender differences include

hormonal changes, increased stress and maladaptive reactivity related to these biological transformations, interpersonal conflicts, and different socialization experiences (Garber, 2006). Recent studies indicated that depression in youth did not increase significantly in the past 30 years (Costello, Erkanli, and Angold, 2006), although the media (Healy, 2003) and earlier studies suggested the opposite (Kessler, Avenevoli, and Merikangas, 2001; Lewinsohn, Rohde, Seeley, and Fischer, 1993). More research is needed to provide reliable prevalence estimates in Canada.

Obviously, the most significant consequence of depression and suicidality is suicide. More than half of adolescents who commit suicide were depressed prior to the event (Bridge, Goldstein, and Brent, 2006). Suicide is a major public health concern in Canada, which has a higher average rate of suicide than most countries. Suicide is the second leading cause of death during adolescence after motor vehicle accidents. In Canada, the means most used for suicide is suffocation, at 39 percent, poisoning, at 26 percent, and firearms, at 22 percent. Men are generally more likely than women to use firearms to commit suicide (Langlois and Morrison, 2002). Interestingly, despite the fact that women more frequently suffer from depression and more frequently attempt suicide, men are five times more likely to complete their suicide. This phenomenon has been called the "gender paradox". In general, suicide attempts are viewed by adolescents as a more feminine behaviour, a call for help, whereas suicide completion is considered a more masculine behaviour. From a risk factor perspective, boys tend to cumulate more risk factors than girls and this co-occurrence increases the likelihood of a lethal attempt.

Death by suicide has increased since the 1960s. In 1991, the suicide rates per 100,000 habitants in the general population varied between 15.8 and 17.8 in the three provinces most affected by this problem: Alberta, Prince Edward Island and Quebec. The highest rate, 33.3, was observed among 20 to 24 year old men. Quebec has the highest youth suicide rate, which has shown a steep increase since 1975 (St-Laurent and Bouchard, 2004), mainly in male teens aged 15 to

19, from 15.8 in 1976 to 28.5 in 2001. Subpopulations that are most at risk are men from First Nations, men who suffer from severe mental illnesses such as depression, schizophrenia, substance abuse, or men who are incarcerated. Regional differences in suicide rates may be the consequence of distinctive cultural values more favorable to suicide and family changes. There has been little theoretical or empirical work on the developmental etiology of suicide and suicidality. Investigating why people, particularly young men, commit or attempt suicide and establishing preventive intervention strategies should be a research priority.

Suicide is a major public health concern in Canada, which has a higher average rate of suicide than most countries. Suicide is the second leading cause of death during adolescence after motor vehicle accidents.

IV. Toward a Comprehensive Etiological Model of Male Adolescent Behavioural Difficulties: Common and Specific Developmental Risk Factors

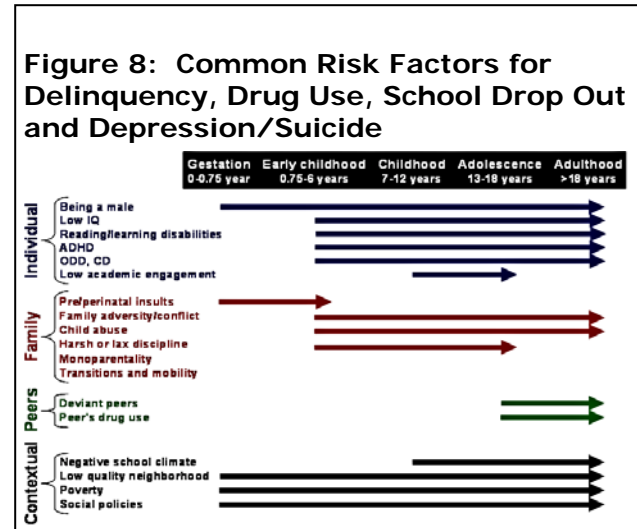
Multiple risk factors for delinquency, drug abuse, school drop-out, and depression and suicide have been identified. What is largely unknown, however, is how risk and protective, factors interact and exert their putative effects throughout each developmental period. Nevertheless, most child and adolescent behavioural problems share common as well as specific risk factors. These risk factors can be categorized in different domains of organization, from individual factors such as genetic, biological, and psychological to social factor domains such as family, peers, school, neighbourhood, and culture. The common risk factors for delinquency, drug abuse, school drop-out, and depression and suicide, and their temporal impact on the major developmental periods are depicted in Figure 8.

At the cognitive level, several individual risk factors or vulnerabilities have been associated with delinquency, including ADHD (Shaw, Lacourse, and Nagin, 2005), poor reading and writing skills (Moffitt, Caspi, Rutter, and Silva, 2001), low IQ, deficits in executive function, and working memory (Barker et al., 2007). As described by Mihalic and colleagues (Mihalic, Fagan, Irwin, Ballard, and Elliott, 2004), early onset delinquents tend to:

- 1) act impulsively, without thinking of the consequences of their actions;
- 2) generate few solutions to interpersonal problems seeing what happens as depending on fate and luck;
- 3) focus on ends and goals but not necessarily the whole sequential process to reach them and;
- 4) exhibit rigid and concrete thinking misinterpreting actions and intentions of others.

Cognitive ability and ADHD are also related to school drop-out and drug abuse including

tobacco smoking (Barkley, 2006; Molina and Pelham, 2003). Some factors may be specific and more directly related to specific outcome. For instance, psychopathy such as lack of empathy and anxiety, which often appears early in ontogeny, increases the risk of gang involvement and delinquency (Lacourse et al., 2006).



The impact of social risk factors on development begins as early as pregnancy. Babies born of young and less educated mothers, mothers with poor dietary habits who used tobacco, alcohol or illicit drugs during pregnancy, and who are antisocial or criminal are more likely to have early cognitive, emotional and behavioural problems (Nagin and Tremblay, 2001b; Shaw et al., 2005; Zoccolillo et al., 2005). Low birth weight, premature delivery and medical complications are also related to early behavioural and learning problems (Arseneault, Tremblay, Boulerice, and Saucier, 2002). Maternal depression and anxiety have also been associated with children's social maladjustment. Although many studies have examined the impact of mothers' social and psychological characteristics on the development and socialization of children, relatively few studies have targeted father's role. Research has been slow in catching up with the multiple mutations that the family went through during the past 50 years. One of the most important changes was the participation of women in the workforce and the increasing number of single parent families.

The lack of research on fathers have been noted since 1975 (Lamb, 1975) and, although some knowledge has been acquired during the past 35 years, it has been somehow limited to the role of fathers on normal child development (Lamb, 2004). Much less is known regarding the impact of fathers on their offspring's psychopathology and maladjustment. A recent meta-analysis by Connell and Goodman (2002) suggested that fathers had a greater influence on children's externalizing behaviour than their internalizing behaviour, whereas mothers influenced both types of behaviour equally. Paternal alcoholism and antisocial personality disorder in the biological father have shown the strongest associations with children's externalizing behavioural problems. In another study, it was shown that father's depression, as well as alcoholism, had a later impact on the development of children's emotional and behavioural problems, whereas maternal depression was associated with difficulties at an earlier age (Shaw et al., 2005). These findings are concordant with the idea that fathers take a more active role later in the socialization process. Rough and tumble play between father and son is a good example of a socialization process that could help regulate physical aggression (Paquette, 2004). A parent in good mental health could buffer the negative effects of the other parent's poor mental health. Overall, the worst circumstances for a child are when both parents exhibit mental problems and develop poor relationships with the child (Kahn, Brandt, Whitaker, 2004; Claes and Lacourse, 2001). Clearly, more research is necessary to partition the specific impact of biological and foster mothers and fathers on boys' maladjustment.

Delinquency

Delinquency, as well as aggression, are not unitary phenomena and their expressions depend on gender, age and context (Gendreau and Archer, 2005). It is well established that males more frequently display physical aggression and commit violent crimes. In addition, they are responsible for approximately 80 percent of all charged crimes in Canada (Statistics Canada, 1998). Conversely, women more often exhibit indirect, non-physical forms of aggression (Crick

and Grotpetter, 1995) and are generally involved in crimes of lesser seriousness (Savoie, 2000; Moretti, Catchpole, and Odgers, 2005). Recent research has also highlighted important differences in the development of male and female delinquency in various neighbourhoods (Kroneman, Loeber, and Hipwell, 2004). Males display earlier onset of delinquency (Loeber and Stouthamer-Loeber, 1998; Silverthorn and Frick, 1999) and are more frequently involved in neighbourhood gangs (Esbensen, Deschenes, and Winfree, 1999). There are also significant gender differences in socialization context. Boys and girls are exposed to different parenting practices (Claes et al., 2005; Keenan and Shaw, 1997) and boys tend to play more in the community than at home. In addition, they are less closely supervised by their parents (Claes, Lacourse, Bouchard, and Perucchini, 2003; Hagan, 1989; Kim, Hetherington, and Reiss, 1999).

Boys and girls are exposed to different parenting practices and boys tend to play more in the community than at home. In addition, they are less closely supervised by their parents.

Social scientists have long been interested in the longitudinal sequences and patterns, that is, onset, persistence and ending, of delinquent and criminal behaviour over the life-course. Several longitudinal studies have been established in Canada (www.gripinfo.ca), United States and New Zealand (Fergusson and Horwood, 1995). Their primary goal has been to understand the dynamics of risk and protective factors in relation to social behavioural development, particularly delinquency, and particularly in males. In recent years, the concept of developmental trajectories has been utilized to describe groups of males displaying similar levels of aggressive and/or delinquent behaviour over time, from childhood to adulthood (Lacourse et al., 2002; Nagin and Tremblay, 1999).

There are ten well accepted findings about the development of male delinquency (Farrington, 2003):

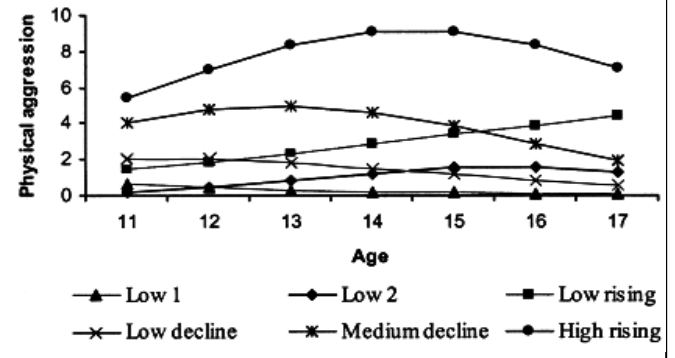
- 1) age of onset is generally between 8 and 14 and desistance between 20 and 29;
- 2) the prevalence of offending peaks between ages of 15 and 19;
- 3) early onset is related to longer criminal career and more frequent delinquent behaviours;
- 4) there is important continuity in criminal behaviour over the life-course from childhood to adulthood, although the majority of disruptive children will not become delinquents;
- 5) a small proportion, 5 to 9 percent of “chronic offenders” commit most of the crimes and they tend to be early onset offenders;
- 6) delinquents are initially versatile but they generally specialize when they get older;
- 7) delinquents are also involved in other risky behaviours such as heavy drinking and substance use, reckless driving, promiscuous sex, etc.;
- 8) during adolescence, delinquency tends to occur in groups and the most frequent and severe offenders are gang members;
- 9) offending during adolescence is generally less utilitarian but more motivated by boredom, search of excitement or emotional catharsis, and;
- 10) there is a sequence in offending that generally starts with minor offenses at younger age progressing to more serious offenses at older age.

Importantly, these findings are only applicable to male delinquency, until more research about the developmental aspects of female delinquency is conducted. For a recent review on female delinquency, see Lanctôt, *in press*.

Moffitt (1993) and Patterson, DeBaryshe, and Ramsey (1989) were among the first to describe the development of antisocial behaviour using a taxonomy defined by two subgroups of males, with risk and protective factors being different for these two developmental pathways. A first

Figure 9: Trajectories of Physical Aggression in Adolescent Males

(Lacourse et al., 2002)



subgroup comprises individuals who exhibit problem behaviours during early childhood as well as criminal behaviours during adolescence and adulthood. Another subgroup includes individuals displaying antisocial behaviours that are limited to adolescence. However, recent evidence indicates that:

- 1) late onset trajectories are far less common than originally suggested by Moffitt (1993);
- 2) the number of trajectory groups is far greater than originally expected (Brame, Nagin, and Tremblay, 2001; Bushway, Thornberry, and Krohn, 2003; Lacourse et al., 2002), and;
- 3) predictors and outcomes often differ for specific developmental patterns or longitudinal sequences of behaviours (Nagin, Barker, Lacourse, and Tremblay, *in press*; Nagin and Tremblay, 1999; Nagin and Tremblay, 2001b; Oldgers et al., *in press*).

Moreover, physical aggression peaks at an early age and declines afterwards (Loeber and Hay, 1997; Nagin and Tremblay, 2001b; Tremblay, LeMarquand, and Vitaro, 1999). Figure 9 presents examples of developmental trajectories of physical aggression in males from age 11 to 17 (Lacourse et al., 2002).

Drug Use

Adolescence is a key period for the establishment of behavioural patterns related to use of both licit and illicit substances. In the US, about five percent of adolescents qualify for a diagnosis of substance use disorder (Tarter, 2002). Men seem to be less vulnerable than women to the detrimental effects of substance use, though they are twice to four times more likely to develop a drug abuse disorder well into adulthood. This includes alcohol, cannabis and cocaine addiction (Brady and Randall, 1999; Bryant, Schulenberg, Bachman, and Johnston, 2003). Some studies suggested that differences in hormonal response to drugs may explain the gender differences in the development of addiction (Lynch, Roth, and Carroll, 2002; Quinones-Jenab, 2006). However, not only are men more likely to abuse substances and develop pharmacodependance, they are also more likely to be involved in pathological gambling, with an earlier onset compared to women (Petry, 2005), suggesting that being male represents a general risk factor for different forms of addictions.

Addiction and drug dependency represent the extreme point on a continuum progressing from experimental and casual use to loss of control due to drug effects in the brain. Substance abuse has long been recognized as being influenced by a multitude of contextual factors, including:

- neighbourhood factors such as norms favorable to drug use or community disorganization;
- school factor including academic failure, low commitment, school climate and school policy toward drugs;
- family factors incorporating elements such as poor management, history of substance use and positive or indifferent attitude toward drug use; and
- peer factors such as deviancy or drug use, and individual factors, including rebelliousness, sensation seeking, high risk taking, and low motivation to complete academic program (Bryant et al., 2003; Kumpfer and Turner, 1990; Tarter, 2002).

Easy access to drugs from family members and peers is obviously a key factor for the initiation of drug use and misuse. Some individuals develop chronic addictive behavioural patterns more promptly than others, pointing to the possibility that some individuals may be genetically or, more exactly, biologically predisposed to the addictive effects of drugs. Such genetic or biological predisposition may explain, beyond the mere modeling effect of parents and peers, why a family history of drug problems is one of the most significant risk factors for the development of drug dependency. Indeed, animal models of addictive behaviour have clearly demonstrated the biological nature of addiction, with specific genetic or biological predispositions linked to specific drugs. Accordingly, it is suggested that social context, that is, peer affiliation, may play a more direct role in the early stages of the addiction process or experimentation, and in occasional use of substances, whereas individual factors such as biological predisposition, may be more significantly involved in the process of abuse and addiction.

The hypothesis that "mild" drugs such as cannabis may act as a "gateway" to harder ones such as cocaine has been much debated and has served as a major rationale for upholding substance prohibition, mainly cannabis, since the mid-1960s (MacCoun, 1998). There is a significant correlation, as well as a typical developmental or temporal sequence of drug use, with use of alcohol and tobacco preceding cannabis use and use of cannabis preceding that of hard drugs (Kandel, 2002). Indeed, most heroin and cocaine users have first used tobacco, alcohol and cannabis. But like correlation, temporal precedence is not sufficient to establish causality, since the majority of those who use alcohol, tobacco and cannabis do not end up using harder drugs. Casual drug experimentation during adolescence is well within the range of normality. Those who proceed from tobacco to cannabis to harder drug use, and from casual to chronic use, commonly exhibit a higher propensity toward criminality, academic failure and unemployment. This is why prevention programs for drug abuse must provide special attention to teens expressing other forms of

behavioural difficulties. These programs, in order to be effective, must target different facets of individual development that include disruptive behaviour and delinquency, conduct disorder, academic issues, and the psychological underpinnings of these social behavioural difficulties, particularly depression, suicidal tendency and bipolar disorder (Weinberg and Glantz, 1999).

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As pointed out by West (2006), addiction may be better viewed as a symptom than as a pathological disorder. A number of theoretical models have been proposed to explain why people become chronically addicted to substances or activities, for example gambling, ranging from the theory of rational addiction, using a drug that has benefits, to the self-medication model of addiction, using a drug to overcome negative mental states due to transitory unpleasant mood or chronic psychiatric disorders. Several typologies of substance dependence have been proposed, based on single characteristics such as personality, family history, presence of antisocial behaviour, gender, age of onset of drug dependence, and developmental trajectory (see Zucker, 2006, for a review).

Other typologies are based on multiple criteria such as dichotomization of alcoholism into type I, characterized by late onset occurrence and relatively minor social complications, and type II, which has an early onset, higher putative genetic liability and is more frequently observed in males (Cloninger et al., 1988). Babor's categorization (Babor et al., 1992) of alcoholics based on the number of individual, social and developmental

risk factors, as well as clinical significance, refers to type A with late onset, few childhood risk factors, less severe dependence and psychopathology, and fewer alcohol-related problems. Type B is associated with early onset of alcohol-related problems, presence of risk factors during childhood such as family alcoholism, greater severity and chronicity of dependence, higher psychopathological comorbidity, and polydrug use. Type A and type B distinction has been generalized across users of various substances including marijuana, cocaine and heroin (Ball, Carroll, Babor, and Rounsaville, 1995; Feingold, Ball, Kranzler, and Rounsaville, 1996). Although subtyping individuals into categories may be clinically valuable in identifying individuals that respond to treatment and those who do not, and which may enhance treatment effectiveness, it also bears the risk of stigmatization. Nevertheless, these studies have identified a variety of risk factors that increased the probability of developing substance abuse and dependence.

Dropping Out of School

Although school drop-out is clearly associated with lower academic performance, not all drop-outs have academic problems in school. This observation underlines the importance of examining other factors for understanding the etiology of school drop-out. Multiple antecedents and concomitants of academic failure and school drop-out have been identified (Rumberger, 1995). Along with gender and lower IQ, individual risk factors include presence of behavioural problems such as hyperactivity and inattention, aggressiveness and drug use (Fergusson, Horwood, and Beautrais, 2003; Jimerson, Egeland, Sroufe, and Carlson, 2000; Lynskey, Coffey, Degenhardt, Carlin, and Patton, 2003). At the contextual social level, peer relations, deviant peers, and, perhaps more predominantly, early home environment, quality of parental care, as well as parent involvement in school affairs are key predictors of children's academic success or failure (Cairns and Cairns, 1994; Jimerson et al., 2000). Perinatal complications, child abuse, low socioeconomic status (SES), and ethnic minority status also impact significantly on the probability of dropping out of school (Cairns, Cairns, and

Neckerman, 1989; Jimerson, 2001; Manlove, 1998; Nomura, Chemtob, Fifer, Newcorn, and Brooks-Gunn, 2006). Consequences of school drop-out are multiple and go beyond the risk of being unemployed or having low income. There is, for instance, a higher probability of alcohol dependence (Harford, Yi, and Hilton, 2006) and suicidality (Daniel et al., 2006) among high school drop-outs.

From a developmental and ecological perspective, behavioural problems, peer relations and academic difficulties do not arise in school. Dropping out of school is a dynamic, multivariate, multifactorial developmental process that begins prior to elementary school entrance. In order to alter the probability that at risk children take the developmental pathway to school drop-out, prevention programs must be implemented early and target disorganized family settings and neighbourhoods. Not only is plasticity of the brain greater at a young age, a factor, but so is the family environment, which shows higher malleability at an early stage when the family unit is small and not enduringly disorganized. Initiating intervention at this highly receptive period may help prevent the "snowballing effect" toward behavioural maladjustment and academic failure (Jimerson et al., 2000).

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Depression and Suicide

The developmental course of depression and suicide peaks after puberty during late adolescence and early adulthood; it is quite rare during childhood (Bridge, Goldstein, and Brent, 2006). Although the media often portray sadness and lack of motivation as the main symptoms of depression, other emotions or moods are particular to youth. These include anger reactions elicited by small provocations and social withdrawal. Irritability could be the primary mood symptom in youth, particularly in boys. As

depressed teens seldom seek help, parents, teachers and school counselors must pay close attention to irritability, especially when academic underachievement, failing grades, poor school attendance, and physical complaints are simultaneously observed. Early onset of depressive symptoms and a family history of depression increase the risk of recurrent episodes. Stressful life events can also precipitate the appearance of depressive symptoms. Depression often co-occurs with anxiety disorders, which, compared to externalizing behavioural disorders, are less obvious to identify in children and adolescents (Turgeon and Gendreau, 2007).

Suicidality and suicide are also linked to delinquency and follow similar developmental trajectories. Generally, adolescents are clearly able to plan and execute suicide attempts that are lethal. In fact, adolescent suicide victims are often more cognitively developed. Suicide is the end result of an accumulation of risk factors and comorbidities in multiple domains. Lack of parental supervision and social isolation, induced by changes in family relationships in late adolescence and young adulthood, have been associated with suicide. Comorbid psychopathology during adolescence and early adulthood, particularly mood disorders and substance abuse, have been shown to increase the risk of suicide attempts and suicide completion during this period (Brent, Baugher, Bridge, Chen, and Chiappetta, 1999). Indeed, it has been estimated that nearly 90 percent of young adults who committed suicide presented a form of psychopathology. Moreover, the chronicity and the severity of the mental disorder increase the level of suicidal risk (Brent, Perper, Moritz, Friend et al., 1993; Brent, Perper, Moritz, Liotus et al., 1993). People suffering from manic depressive disorder are particularly prone to attempting suicide, especially when substance and/or alcohol abuse co-occurs, which is often the case.

Externalized behavioural symptoms during childhood such as conduct disorder and ADHD are also important predictors of suicidality during adolescence. Again, the combination of these risks with substance abuse in adolescence

increases the likelihood of suicidal behaviour. Independently of depression, children and adolescents who react impulsively and aggressively to provocation are at increased risk for suicide. Child maltreatment, in particular sexual and physical abuse, has also been linked to suicidality (Bridge et al., 2006) as are psychotic disorders and schizophrenia, although mainly for older suicide victims (Allebeck, Allgulander, and Fisher, 1988). Moreover, gay, lesbian and bisexual individuals (Bridge et al., 2006) as well as those who prefer industrial, gothic, and/or heavy metal music (Lacourse, Claes, and Villeneuve, 2001; Young, Sweeting, and West, 2006) are at greater risk of suicidality. This is likely caused by higher rates of depression, impulsivity, substance use and abuse, victimization, and family rejection and conflicts among these groups of individuals. Lack of involvement of these youth in more conventional social institutions might also be an explanation. Stressful life events such as conflictual relationships with family members and peers are obviously important precipitants of suicidal behaviours in children exposed to other risks. Very few studies have examined community effects on suicide. Classic studies by Durkheim suggest that a strong integration in the community is an important protective factor. Religious and cultural beliefs against suicide can also be important protective factors.

Bridge et al. (2006) recently suggested a developmental-transactional model to explain suicidality in youth. According to this model, two sets of childhood vulnerabilities can influence suicidality in adolescence and adulthood. The first domain of vulnerability is related to trait-like variables such as mood and temperament, for example, neuroticism, or anxiety. The second refers to state-like variables such as cognitive emotional regulation, for example, impulsivity, aggression and executive functioning. Results from other studies suggest a bidirectional relationship between depression and impulsive or reactive aggression (Brent et al., 2004; Jaffee et al., 2002). Identifying early precursors to suicidality can be beneficial to enhancing the efficiency of current prevention programs.

V. Multimodal and Evidence-Based Prevention and Intervention Programs

Prevention programs can be divided in two broad domains: those focusing on the environment, for example, family, school or community, and those focusing on the individual such as behaviour and cognition, mentoring, supervision, and aftercare programs. These prevention programs can be *universal*, that is, for the whole population, or *selected*, for example, for at-risk children.

Intervention programs are said to be *indicated* as they are directed at individuals who already exhibit relatively high levels of behavioural maladjustment such as delinquent teens and recalcitrant offenders (Doob and Cesaroni, 2004; Winterdyk, 2005). Intervention with adolescents and young adults exhibiting behavioural difficulties yields relatively limited results, especially when incarceration due to delinquency or possession of illicit drugs is necessary. Therefore, preventing adolescent behavioural maladjustment by targeting social risk factors during childhood, that is, before the difficulties become more serious, has been viewed by research scientists and clinicians as the most efficient and cost-effective way to tackle the phenomenon.

The vast majority of early intervention programs have been directed at preventing delinquency and academic difficulties. As noted by several researchers, some programs work better than others, and most either do not work at all or may even make kids worse. Several programs have attempted to reduce children's disruptive behaviours and academic difficulties by targeting the community, the school, the family, and/or the individual (e.g., Durlak and Wells, 1997; Farrington and Welsh, 2003). However, few have been assessed properly. Meta-analyses indicate that intervening on a single or a few putative risk or protective factors is generally ineffective and insufficient to positively alter the developmental trajectory of at risk individuals. Prevention programs based on behavioural, skill-oriented and multimodal practices are the most effective (Lipsey, 1992).

Meta-analyses indicate that intervening on a single or a few putative risk or protective factors is generally ineffective and insufficient to positively alter the developmental trajectory of at risk individuals. Prevention programs based on behavioural, skill-oriented and multimodal practices are the most effective.

An extensive research report recently published by the US Office of Juvenile Justice and Delinquency Prevention assessed more than 600 prevention programs all over North America (Mihalic et al., 2004). Based on strict evidence-based research criteria, only 11 “model” programs and 21 “promising” programs were found to be effective. These programs included a strong research design, were replicated in multiple sites, and yielded significant and sustained positive effects. Three main strategies appear to be effective in modifying the home environment of at risk children: home visiting programs, parent training and family therapy. The primary focus of home visiting programs is to target risk factors early in ontogeny, preferably during pregnancy, a period of high fetal and maternal vulnerability. Maternal and paternal smoking and drug use, poor nutrition, health related behaviours, and parental skills have generally been targeted. Programs that focus on teenage mothers as risk factors frequently tend to co-occur in this subgroup. One pioneer prevention, the Nurse Family Partnership, has shown positive effects on cognitive and social development of children (Olds et al., 1998). Combined with other programs such as the High/Scope Perry Preschool, home visiting has reduced violent delinquency during adolescence (Gomby et al, 1993). This program has been found to be cost-effective with savings exceeding program costs by a factor of four.

The Incredible Years (Webster-Stratton, 1990) is a multi-component program, both at home and at school, that promotes social, emotional and academic competences of children through social skills training, understanding of feelings, conflict management skills, and reduction of negative

attribution. The program has been evaluated in randomized trials and has shown to be effective in reducing conduct problems. This is primarily achieved by helping parents develop interactive play, reinforcement skills, non-violent discipline techniques, and efficient problem-solving strategies. Sometimes, intensive family therapy is required when problem behaviours and dysfunctional family relationships have been long established. Then, the goal is to focus on the interrelationships between members of the family and to target resistance to change among family members. There are two indicated “model” therapies: the Functional Family Therapy (Alexander and Sexton, 2002) and Multisystemic Therapy (Henggeler and Hoyt, 2001) for children and adolescents aged 10 to 18 presenting conduct disorder, oppositional defiant disorder and substance abuse. Outcomes of these cost-effective programs are impressive: a reduction in the rates of re-arrest of 25 to 70 percent, a reduction of 50 percent in out-of-home placements and a decrease in mental health problems for young offenders.

Targeting the school environment may also lead to positive outcomes, as climate, structure, rules, and norms either increase or decrease the behavioural difficulties of children and adolescents. Implementing effective preventive strategies during the school years not only enhances academic achievement in students at risk of school drop-out but also in students with behavioural problems that may lead sooner rather than later to departure from school. Three strategies are recommended at the school level:

- 1) establishing norms and expectations for behaviour,
- 2) reorganizing classes and grades, and
- 3) improving school and classroom discipline and management.

Grade retention provides few short term benefits but no long-term advantage for students with academic difficulties; it does not increase the probability of exhibiting positive social and emotional outcome (Jimerson, 2001) nor the probability of succeeding in school (Jimerson, 2001; Westbury, 1994). In fact, evidence indicates

that grade retention further increases the risk of social maladjustment, particularly for boys (Jimerson, 2001; Pagani, Tremblay, Vitaro, Boulerice, and McDuff, 2001). Targeting school engagement and school climate, drug use and other associated risk factors may be beneficial but it may bear only weak societal impact if each variable is targeted by itself. There are only two “model” programs at the school level and they mainly focus on changing norms and expectations of children’s behaviour: the Olweus Bullying Prevention Program (Bauer, Lozano, and Rivara, 2007) and the Midwestern Prevention Project (Pentz, Mihalic, and Grotspeter, 1997). The Montreal Longitudinal and Experimental Study was one of the first Canadian preventive intervention programs for disruptive boys to show long-term effects on general delinquency and, more specifically, on physical violence, gang membership, alcohol and drug use, and school drop-out (Boisjoli et al., *in press*; Lacourse et al. 2002; Tremblay, Mâsse, Pagani, and Vitaro, 1996; Vitaro, Brendgen, and Tremblay, 2001).

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Communities that provide mentoring, tutoring, supervision, and aftercare programs are also highly likely to reduce delinquency and recidivism in youth. One very extensive program, the Big Brothers Big Sisters of America, includes more than 145 000 one to one relationships between youth and volunteer adults. This mentoring program requires three “meetings” a month. An 18 month follow-up study showed a strong reduction in alcohol and drug use, aggressive behaviour and school misconduct (McGill, Mihalic, and Grotspeter, 1997). The Multidimensional Treatment Foster Care (Chamberlain, 1990; Chamberlain and Mihalic, 1998) is a cost-effective alternative to incarceration or hospitalization of adolescents. The main goal of this program is to decrease participation in delinquency by providing a highly

structured foster family home to troubled adolescents.

Although behavioural difficulties are heterogeneous and multifactorial in etiology, they share common risk factors. Social policies must definitely target these key risk factors via universal prevention programs, yet it is mandatory to provide further resources to specific segments of population, for example, males, First Nations, single parents, and teenage mothers. In order to be effective, preventive or curative interventions must, therefore, take place at every level of social organization, with a particular emphasis on family and school. These units are nested in neighbourhoods and communities that may be characterized by different cultural values. Thus, the purpose of intervention and social policies must not only be the individual but the broader ecological environment in which he or she lives and develops.

Family interactions and dynamics play a considerable role in the onset and establishment of behavioural difficulties. Parenting practices, family functioning and family interaction styles are important risk factors for delinquency and drug abuse. More specifically, harsh, ineffective and inconsistent parenting, lack of warmth, dysfunctional parental monitoring, abuse and neglect, and poor attachment have been associated with all four ‘D’s of adolescent difficulties. Any kind of abuse, physical or verbal, increases the risk of future maladjustment and this risk may be exacerbated by genotype (Caspi et al., 2002). Children living in these family environments are at higher risk of exhibiting coercive and aggressive attitude towards other others and using inefficient problem-solving skills.

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Schools and communities are other key contexts in which to instigate intervention for children who already display disruptive behaviour. Poor

and highly mobile neighbourhoods are often characterized by a higher concentration of children with early risk factors of delinquency, drug use and academic failure. Accordingly, maladjusted attitudes and behaviours toward others, particularly toward teachers and peers, as well as toward society in general, become less marginal and are more easily accepted. In addition, a culture of violence and low expectations about academic success are particularly difficult to neutralize, as young, untrained and less experienced staff tend to concentrate in these schools (Mihalic et al., 2004). Schools where norms of behaviour are clearly stated and enforced present less victimization of children and teachers. Children, families and schools are nested within communities that influence, directly and indirectly, the developmental outcome of children and adolescents. At risk communities are generally disorganized and economically challenged, with high unemployment and mobility rates (Sampson, Raudenbush, and Earls, 1997). Surveillance of public places is generally minimal or absent, increasing the risk for gang involvement and drug dealing (Tita, Cohen, and Engberg, 2005), particularly for children with individual risk factors such as hyperactivity and lack of guilt and empathy (Dupéré, Lacourse, Willms, Vitaro, and Tremblay, *in press*). Being involved in a gang and dealing drugs significantly increase not only the risk of violence, delinquency and drug use (Lacourse, Nagin, Tremblay, Vitaro, and Claes, 2003; Thornberry, Krohn, Lizotte, Smith, and Tobin, 2003), but also the risk of being victimized or killed (Curry and Decker, 2003). These effects on deviant behaviours of boys have been well documented.

According to Jencks and Mayer (1990), quality of neighbourhoods may influence child and adolescent development through different processes, namely by means of:

- 1) neighbourhood resources such access to stimulating and learning environments and police presence,
- 2) community social organizations that not only promote structure and routines, but positive role models in relation to

- supervision and other forms of monitoring,
- 3) intervention on problems and behaviour to reduce contagion of negative attitudes and behaviours in the community and among peers,
- 4) scarcity of resources that may promote competitiveness and conflict, and
- 5) relative deprivation, that is, conditions that affect people's perception of their situation due to large differences between individuals such as difference in income.

Accordingly, laws and public policies that alter the ecological context in which behavioural difficulties arise may have a large impact on individual social development. For instance, meta-analyses indicated that recidivism was less likely when preventive interventions were conducted in the community rather than in legal institutions (Doob and Sprott, 2006a; 2006b; Lipsey, 1992).

At the macro level, targeting socioeconomic status (SES) of families should be a priority, since most risk factors cluster in poor families that live in disorganized neighbourhoods. Policies related to poverty and welfare must be reformed to reduce the impact of SES variations in richer occidental countries. Over and above the 4 'D's, SES still plays a major role in the future health of individuals, from diabetes to cancer (Banks et al., 2006). Discrepancy in SES within one country, the "relative income hypothesis", has been strongly related to the general "well-being" of individuals (Kanhemann et al., 2006). Pioneered by Doug Willms, studies documenting the effect of SES on child development in Canada and other countries are compelling. Initiated in 2002, the research project Raising and Leveling the Bar: A Collaborative Research Initiative on Children's Learning, Behavioural, and Health Outcomes has shown the importance of targeting social inequalities to ensure the long term prosperity of Canadian children, adolescents, and adults (<www.unbcrisp.ca/learningbar/>).

At the macro level, targeting socioeconomic status of families should be a priority, since most risk factors cluster in poor families that live in disorganized neighbourhoods.

VI. Recommendations for Public Policies and Research

Adolescents are emerging adults (Graham, 2004) and teenage years represent a rich developmental period, filled with challenges and speculation for the future and adulthood. For a small proportion of these teenagers, adolescence is also a period of turmoil, marked by the appearance or crystallization of various behavioural difficulties, including mental health disorders such as schizophrenia and bipolar disorder. Marked by technology and economic performance, the second half of 20th century has witnessed a rapid change in science and society. The first edition of the DSM (psychiatric diagnostic manual) in 1952 did not include child or adolescent disorders. Most child social, learning and behavioural difficulties are now part of the DSM IV-TR. In addition, the mapping of the genome is now complete and the science of genes has become the central point of focus for many researchers, including those involved in social and human sciences. Furthermore, compounds with enhanced specificity and lesser secondary effects are increasingly available, providing a large pharmacological repertoire for treatment of most physical and mental disorders. Now well implanted in our occidental culture, this new trend in research and treatment may, however, present insidious drawbacks to preventive interventions.

Medicalization of mental disorders, a process by which traditionally non-medical issues are defined and treated as medical pathologies or illnesses, have been increasingly prominent. Despite substantial improvement in regulating various symptoms and reducing the burden of mental health, this trend has been criticized. The February 2007 issue of the prestigious medical journal, *Lancet*, thoroughly discussed the

phenomenon of medicalization that is now generalized to other issues such as children obesity, biological differences in ethnic and race response to pharmacological treatment, and even school failure and child abuse (Duster, 2007). Accordingly, medications such as stimulants, anxiolytics and antidepressant drugs are viewed as the primary resource for intervention.

Conrad (2006) has provided a compelling historical demonstration of the medicalization of children's disruptive behaviours over the last 25 years, behaviours that were initially considered as moral problems. For US children and teenagers, a 2.5 fold increase in the proportion of office visits resulting in a prescription for psychotropic medication was observed between 1994 and 2001 (Thomas, Conrad, Casler, and Goodman, 2006). The most striking increase was for selective serotonin reuptake inhibitor (SSRI) and stimulants generally used for treating mood disorders and ADHD respectively. From 1999, there was a sharp rise in prescriptions that could be related to the marketing of new drugs such as Celexa (citalopram) and Concerta (longer lasting methylphenidate) along with extended availability of old ones such as Ritalin. In Canada, the number of Ritalin pills dispensed in pharmacies, primarily for boys, increased from 26.6 million pills in 1994 to 56.2 million in 1998, an increase of 111 percent in a mere four years (Canadian Institute of Child Health, 2001). Forty-one percent of these pills were sold in Ontario alone.

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Although drugs have proven their efficiency in relieving symptoms of depression, anxiety and ADHD, there have recently been some concerns. Experimental studies of drug efficacy have been traditionally conducted in adults, except perhaps for methylphenidate. Birmaher et al. (2003) found that fluoxetine (Prozac) reduced anxiety

symptoms by 61 percent in children versus 35 percent for placebo. Efficacy improved to 78 percent with paroxetine (Paxil) compared to 38 percent for those who received placebo (Wagner et al., 2004). In another study with children, depressive symptomatology was reduced by 69 percent with sertraline (Zoloft), compared to 59 percent with placebo (Wagner et al., 2003). When these authors concluded that sertraline effectively enhanced the well-being of children, they did not stress the relatively minor improvement compared to placebo (see Garland, 2004 for a critique of pharmacological studies with children). Although it is generally argued that the benefits of medication outweigh the risk, the issue of medicalizing people, particularly children and adolescents, calls for serious examination. Long-term effects have not yet been assessed for most pharmacological agents and some detrimental effects have been reported. For example, the SSRI paroxetine (Paxil) has been shown to increase suicidal risk in adolescents. Due to pressure by some scientists, by exaggerated media coverage and, probably, more by increasing litigation, paroxetine is not prescribed to children and adolescents anymore.

The issue of medicalizing people, particularly children and adolescents, calls for serious examination. Long-term effects have not yet been assessed.

Thomas et al. (2006) suggest five main explanations for the possible rise in prescriptions:

- 1) expanding definitions of psychiatric disorders,
- 2) a more positive view by the public of psychotropic drugs following the Prozac revolution,
- 3) increased willingness of physicians to prescribe these drugs to adolescents,
- 4) more difficulties in having easy and free access to therapists and increasing reliance on relatively cheaper medications, and
- 5) direct advertisement to consumers through cable television from United States. In the United States, overall

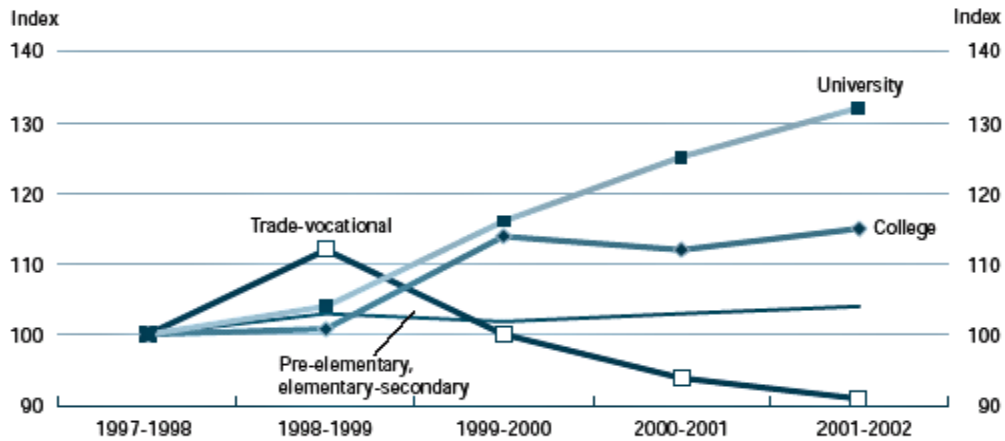
spending by the pharmaceutical industry on television advertising increased six fold to \$1.5 billion dollars between 1996 and 2000.

In summary, the biggest pitfall of medicalization is that social factors such as poverty and exclusion are overlooked and replaced by the biological underpinnings that are seen as the proximal mechanisms responsible for the problem. We do not refute the concept that mental disorders are ultimately the results of brain activity and biological "dysfunction", but we stress the importance of looking beyond the proximal mechanisms, specifically at the contextual factors that may instigate this biological dysfunction. These days, clinical strategies are biased toward reducing the symptoms rather than looking at the roots of the problem, and young boys are more likely to go through this process of medicalization due to the kind of symptom behaviors that they display.

Social prevention at any level is a cost-effective alternative, not only to medicalization of most behavioural difficulties but to justice interventions as well (Mihalic et al., 2004). The health and justice systems are a burden to society's economic development because they promote an intervention culture that primarily and directly targets the individual, particularly his or her biology. By using a biopsychosocial developmental perspective and by looking at the broad and multilayered structure of behaviour and social interactions (see Figures 1 and 2), we can reduce the adverse effects of medicalization and stigmatization, a process by which labelling of disorders, particularly mental disorders, generates stereotyping, discrimination and prejudice and causing individuals to internalize such castigation (Hinshaw, 2005). In the end, we must consider the fact that preventive intervention targets the long-term well-being of individuals and society.

Social policies need to be adjusted to respond to emerging trends and to reduce the impact of social inequality on health. For instance, alcoholism is just behind tobacco smoking as the most costly of all drug problems in Canada.

Figure 10: Trend in Funding in the Canadian School System, from Canadian Education Statistics Council (2006)

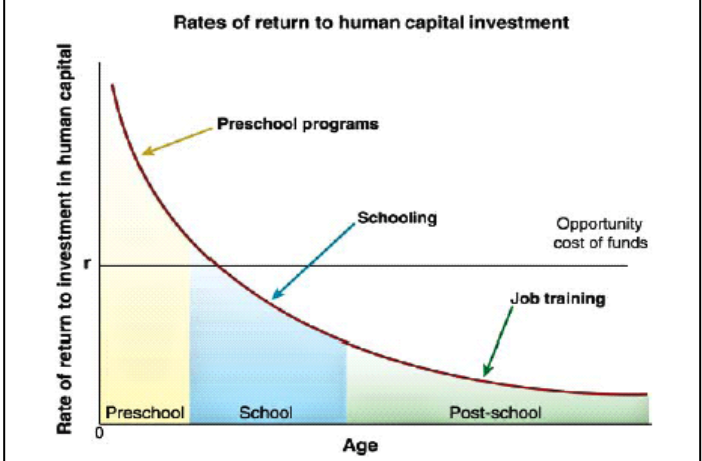


Interestingly, societal costs of substance abuse were estimated at \$39.8 billion in 2002 (Rehm et al., 2006). Thirty-nine percent of costs to the economy, mainly health care and enforcement, were direct and 61 percent of costs such as productivity losses resulting from disability and premature death indirect. Thomas and Davis (2006) reported that the total direct costs of alcohol are more than double those of all illicit drugs. Specifically, combined alcohol-related health care costs were \$3,306 million compared to \$1,062 million for illicit drugs other than cannabis and only \$73 million for cannabis. Most perplexing are costs for health care, which are 31 times higher and costs for enforcement, which, in turn, are 39 times higher than costs for prevention and research on substance use and misuse. According to a recent classification of 20 drugs based on the three parameters of physical harm, risk of dependence and social harm, alcohol was the fifth most harmful substances (Nutt, King, Saulsbury, and Blakemore, 2007). Tobacco ranked ninth, whereas cannabis was eleventh, well ahead of ecstasy, which was eighteenth. The alarming impact of alcohol and tobacco on society and individual physical and mental health calls for a critical examination of our social policy and prevention strategies. A more coherent drug policy would likely have a positive impact on delinquency and criminality in Canada.

Another arguable issue concerns funding policies for education. Despite the fact that pre-

elementary, elementary and secondary schools represent a highly sensitive period and context for the establishment of behavioural difficulties, there is an incongruous share of funding among education levels. Resources are necessary to assist teachers, special educators, social workers, and other professionals working with and for children, and this work must be done early in the school curriculum. In 2001-02, 59 percent of public and private funding was attributed to the elementary and secondary school systems and 41 percent to post-secondary levels, including colleges and universities (Canadian Education Statistics Council, 2006). Nevertheless, university funding increased by 32 percent from 1997-98 to 2001-02, whereas the increase was only 4 percent

Figure 11: Differential Investment Based on Developmental Periods, from Heckman (2006)



for elementary and secondary schools (see Figure 10). This trend is not consistent with the social and economic tenet that funding in early education provides a better investment for the future and our society (Heckman, 2006, see Figure 11).

Developmental maladjustment at the cognitive, affective or behavioural level most frequently emerges in elementary school, sometimes in high school. Schools represent a context and time period wherein competent specialists must be able to identify and intervene on a host of behavioural difficulties, interact with parents and family, often with law enforcement and the criminal justice system, with substance abuse treatment clinics, and with other health clinicians.

These people must be adequately trained to know and identify not only behavioural difficulties but also the biopsychosocial factors that cause those difficulties. Hiring a competent professional workforce in school settings that establishes a link with families and provides a range of co-ordinated and integrated services for the child and the family is not an option, but a necessity. Teachers and clinicians must be up to date with evidenced-based preventive intervention and have annual training so the culture of prevention is better implanted in the educational system. This is particularly important in poor and excluded communities.

VII. Concluding Remarks

Based on this review of the literature on the state of boys in the 21st century, it appears that boys have more biological, neurological or genetic risk factors early in their development that could impact their adolescent development. Although the prevalence estimates are small, boys are more likely to have pervasive developmental disorders such as autism, Asperger and Rett syndromes. These disorders affect social interactions, communication and behaviors that are indirectly related to the 4'D's. Boys are also twice as likely to present learning disorders and ADHD. Learning disorders are often inherited from parents or related to birth complications, exposure to toxins or head injuries in early childhood and also to long term exposition to

television. Did the prevalence of these early risk factors change during the past 50 years in boys? This remains an open question since most of these disorders were not well known and investigated at the time. Overall, birth complications have been substantially reduced over the past 25 years. Unfortunately, exposure to teratogens might have increased, a most striking trend in some ethnic and socioeconomically disadvantaged communities. More research on the impact of media on young children is also necessary.

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Delinquency has been associated with boys for a long time, but, during the past ten years, there has been more research on girls' delinquency. There has been an important increase in juvenile delinquency over the past 40 years with a slight deceleration after the 1990's. This increase is most notable for property crimes. Although adolescent girls are less severely violent than boys, their level of minor aggression and property crimes has sharply risen over the past 25 years. Self-reported data are generally better in capturing this change in behaviours, since police often deal with delinquent boys and girls differently. Although there has been a traditional view that boys and girls manifest their delinquency differently, studies suggest that severely delinquent boys and girls are quite similar, despite delinquency in boys being more prevalent in our society.

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Although common sense often associates alcohol and drug use with delinquency, trends appear to go in quite different directions. There has been a general decline in alcohol and drug use from 1975 to 1990 with an important increase after 1990. Although prevalence of use is slightly higher for boys throughout, the overall trend appears similar for both genders. Cigarette smoking is the substance abuse that has shown the greatest decrease recently, while cannabis use has shown the greatest increase. Alcohol and tobacco remain the substances of choice among the population, particularly among 20 to 24 year old men.

In her analysis of the apparent gender disparities in education in the United States, "The truth about boys and girls", Sara Mead (2006) concluded that there was no evidence to indicate a "boy crisis in the classroom". In 2004, US boys' academic performance was generally equal to, if not better than, boys' performance in 1971. The trend in high school drop-out among Canadian boys seems to support this claim, as the number of boys dropping out of school decreased by 30 percent between 1990 and 2005 (see Figure 7). Yet, in 2005, males accounted for 64 percent of all school drop-outs, compared to 58 percent 15 years earlier. Finally, it all depends to whom boys are compared. When boys are compared to girls, their academic achievement looks modest indeed. Twentieth century feminism has been one of the most important ideologies promoting equal opportunity in education for girls, at least in western societies. With the advent of feminism, socialization of boys and girls has become more homogeneous. The academic success of girls is, therefore, a consequence of this long process of social justice and changes in socialization practices.

In this 21st century, standardized curricula based on conventional academic activities may not appeal to boys. Art, music, sports, and, more recently, computer programs in school and in the community have been viewed as suitable alternatives to customary education, as well as for after-school activities. As noted by Osgood, Anderson, and Shaffer (2005), most teenage delinquent behaviours occur between 3:00 p.m.

and 6:00 p.m. when school is over and parental supervision is minimal. Compared to girls, boys are undeniably at higher risk of exhibiting behavioural difficulties, but these odds seem to have been reduced somehow in the last 10 to 15 years.

Compared to girls, boys are undeniably at higher risk of exhibiting behavioural difficulties, but these odds seem to have been reduced somehow in the last 10 to 15 years.

Finally, the number of suicides has dramatically increased in males in recent years, becoming the second leading cause of death in youth, and making this problem a priority. This is a situation that is too often exacerbated in communities suffering from poverty and social exclusion, especially among First Nations. Depression is one of the leading causes of suicide, along with drug abuse. Unfortunately, these depressive states are often overlooked in boys because their manifestations are different for boys than for girls and from adolescence to adulthood.

It is important to stress that, while differences between boys and girls clearly exist and males are at higher risk of exhibiting behavioural difficulties, differences among social classes are far more pronounced. Universal prevention programs are necessary to promote health and well-being in all social classes, but additional resources ought to be made available to communities and individuals with the highest number of risk factors. Selected preventive interventions offering better integrated social services are to be provided to at risk communities and to poor and highly mobile neighbourhoods. No matter how efficient universal and selected prevention strategies are, specialized interventions remain necessary for children and teens exhibiting severe behavioural difficulties.

Promotion policies and initiatives are central to the health and well-being of individuals and society. Whereas some messages might not appeal to anti-conformist youth, other messages are contradictory. For instance, the laws prohibit

the use of drugs such as marijuana and ecstasy, but allow the sale of alcohol and tobacco, substances known to be even more harmful. In addition, our culture and our research institutions favour the use of pharmacological tools to solve social and behavioural problems. Not only has this somehow normalized the use of drugs; it has created a new trend by increasing the availability of a variety of prescribed and potentially harmful drugs on the streets.

It is important to stress that, while differences between boys and girls clearly exist and males are at higher risk of exhibiting behavioural difficulties, differences among social classes are far more pronounced.

Prevention and research related to health and well-being of children and their family should be a priority. Early universal prevention for young families is key to improving developmental outcome in Canadian youth. Unfortunately, most of the past and current prevention programs have not been evaluated and are not supported by evidence-based research. As pointed out by Elliott and Tolan (1998), “doing something is not always better than doing nothing”. Indeed, negative impacts have been reported for a variety of prevention and intervention programs targeting disruptive behavior (Dishion, McCord, and Poulin, 1999) and drug addiction (Macgowan and Wagner, 2005), including tobacco smoking (Renaud, O’Loughlin, and Déry, 2003).

Whereas it is clearly imperative to intervene early in life, one cannot neglect adolescence and early adulthood, developmental periods frequently marked by turning points. Approximately three out of four adults suffering a “mental” disorder had an age of onset younger than 24 years (Patel, Flisher, Hetrick, and McGorry, 2007). In addition, adolescents and young adults must face significant developmental changes such as growth or sexuality as well as social challenges from academic underachievement to choice of profession to romantic relationships. Targeting young parents at the onset of pregnancy is a

logical choice for intervention, as any changes in parental behaviour such as quitting smoking or improved parental care may have significant impact not only on their life, but on the life of their children.

As argued by Butz and Boyle (2006), social sciences have their own Hubble telescope longitudinal surveys that provide a way to look into the past and identify useful predictors of negative and positive developmental outcomes. Therefore, longitudinal studies based on large cohorts or waves of individuals from all segments of society and followed from infancy, ideally from gestation, to adulthood are essential to appreciate the complexity of human behavioural development. The National Longitudinal Survey of Children and Youth (NLSCY) is a good illustration of a coordinated research effort to enhance our understanding of the developmental processes leading to behavioural difficulties and adaptation. The ultimate goal is to produce and endorse preventive and curative strategies that are both effective and appropriate to each segment of the population, particularly those most in need. The key is to promote health and well-being via the family system and community networks, while placing young people at the centre of all policy-making.

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