

**Risk and Protective Factors for Youth Gang  
Involvement in Canada: An ecological systems  
analysis**

**by**

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## **Abstract**

Bronfenbrenner's social ecological model and Lerner's youth positive development model were used to frame this study to guide the understanding of risk and protective factors associated with youth gang membership in a Canadian-based sample of male juvenile offenders ( $n = 112$ ). Given the paucity of research on protective factors against gang involvement, attention in the current study was given to exploring whether there was overlap between known protective factors against violence and factors that may protect against youth involvement in gangs. Findings indicated that youth gang involvement was associated with an accumulation of risk factors in individual, peer, family, and community domains and an absence of protective factors in individual and family domains. In addition, some protective factors were found to aggravate the effects of risk factors on gang involvement in youth with psychopathic personality traits. Implications for theory and policy along with recommendations for future research are discussed.

**Keywords:** psychopathy; risk and protective factors; social ecological model; youth gang involvement; youth positive development model

## Dedication

*Dedicated in Loving Memory of*  
*Aaron Bolus*  
*(May 7, 1987 - February 23, 2012)*

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## List of Acronyms

CFI	Comparative Fit Index
CI	Confidence Interval
CORNET	Corrections Network
DAP	Developmental Assets Profile
DF	Degrees of Freedom
FU	Follow-Up
GRAI	Gang Risk Assessment Instrument
ICC	Intraclass Correlation Coefficient
IPFI	Individual Protective Factors Index
M	Mean
Mdn	Median
MHRS	Mental Health, Risks, and Strengths Study
OJJDP	Office of Juvenile Justice and Delinquency Prevention
OR	Odds Ratio
PCA	Principal Components Analysis
PCL:YV	Psychopathy Checklist: Youth Version
SAVRY	Structured Assessment of Violence Risk in Youth
SD	Standard Deviation
SE	Standard Error
SRMR	Standardized Root Square Residual
SRO	Self-Report of Offending
SSDP	Seattle Social Development Project

## Glossary

Cox Regression	A non-linear regression technique used to construct a predictive model for time-to-event data (e.g., time to first offense).
Logistic Regression	A non-linear regression technique used to construct a predictive model for a dichotomous outcome variable (i.e., an event that is either present or absent).
Mann-Whitney U Test	A non-parametric test used to compare the medians of two independent samples.
Mediation	A causal chain in which one variable effects a second variable that, in turn, effects a third variable (e.g., absence of a protective factor causes a risk factor which, in turn, causes gang involvement).
Moderation	A causal chain in which the relationship between two variables depends on the level of a third variable (e.g., protective factors have a stronger effect on gang involvement when risk factors are high).
Negative Binomial Regression	A non-linear regression technique used to compute a predictive model for highly skewed count data with many zero values (e.g., number of arrests).
Protective Factors	Individual or environmental factors that directly or indirectly decrease the likelihood of negative developmental outcome (e.g., gang involvement, violent offending) for the majority of the population, but can sometimes aggravate or have no effects on the outcome in particular subgroups.
Psychopathy	A pattern of interpersonal, affective and behavioral symptoms characterized by a lack of empathy, remorselessness, poor impulse control, and a grandiose sense of self.
Risk Factors	Individual or environmental factors that increase an individual's vulnerability to a negative developmental outcome (e.g., gang involvement, violent offending).
Youth	Persons between the ages of 11 and 18 years.
Youth Gang	"Any durable, street-oriented youth group whose own identity includes involvement in illegal activity (Klein, Weerman, & Thornberry, 2006, page 418)."

# Chapter 1. Introduction

In the early afternoon of October 19, 2007, 22-year old Chris Monahan was on his way to basketball practice when members of a criminal gang executed him and five others. Of the six executed four were young men with involvement in the drug trade, but two of them, including Chris, were innocent bystanders in what is seen as one of the worst gang-related mass killings in the history of British Columbia, Canada. Such high-profile incidents of gang-related violence in recent years have drawn attention to the problem of youth gangs in British Columbia and Canada more generally. Although this offence was committed by adults, these offenders were part of a gang, the Red Scorpions, which formed in the late 1990s while several members were incarcerated in a youth detention facility. The longevity of this gang and the serious violence associated with this group raised concerns that youth gangs were not simply formed by adolescents in a state of minor delinquency. Instead, early gang involvement implied that a more serious trajectory of violent offending was to follow.

Since 1990, over 115 young adults in British Columbia have lost their lives in gang violence and in 2008 official reports estimated about one in four of 600 homicides nationwide were gang-related (Beattie & Cotter, 2010). Interventions designed to facilitate desistance or 'exit' from gang involvement (e.g., Descormiers, 2013) have had little success. A more effective strategy involves identifying adolescents who are at-risk of gang involvement and developing programs that disrupt entry into gangs. However, pathways to gang involvement are complex and consist of various transitions and turning points during the teenage years, including changes in relationships with parents, peer networks, and schooling. In Canada, it is estimated that almost half of youth gang members are under the age of 18 and that the peak ages for gang joining are between 13 and 15 years old (Beattie & Cotter, 2010; Craig et al., 2002). Therefore, from a research-oriented perspective, a theoretical framework is needed that helps identify the types of adolescence-based risk factors that increase the risk of gang involvement. To

identify such factors, comparisons between gang and non-gang involved youth are needed, which in turn will help tailor prevention and intervention programs.

Compared to non-gang affiliated youth offenders and non-offenders, youth gang members are more likely to engage in crime and violence and are disproportionately represented in a range of criminal behaviours including assault, drug dealing, and homicide (Criminal Intelligence Service Canada, 2006; Federation of Canadian Municipalities, 1994). The most common response to violence perpetrated by members of youth gangs has been additional policing and harsher sanctions (Chettleburgh, 2007; Totten, 2009). These crime control-oriented responses (Corrado & Markwart, 1994) have been ineffective in reducing crime and deterring gang involvement (Dunbar, Waller, & Gunn, 2011). Recently, there has been growing support for the use of evidence-based prevention and intervention strategies to decrease gang involvement and gang-related violence. In order for these strategies to be successful, a comprehensive understanding of the factors that influence why youth join gangs is required. Knowledge of risk and protective factors (i.e., factors that respectively increase or decrease the likelihood of gang involvement) are important as they provide insight into the larger picture of youth gang participation and offer empirically-informed guidance in developing more focused prevention efforts (Farrington, 2000). However, the extant research regarding risk factors for and protective factors against gang involvement in Canada is sparse, thus a more comprehensive understanding of the factors that help to prevent Canadian youth gangs is limited (Chettleburgh, 2007; Criminal Intelligence Service Canada, 2006; Public Safety Canada, 2007; Wortley & Tanner, 2005). This may be, in part, due to confusion regarding (a) the appropriate theoretical framework that should be used to guide research on youth gang involvement, (b) how protective factors should be defined, and (c) how risk and protective factors should be measured. In effect, although many theories have been developed to explain gang involvement and can be used to provide this framework, these theories are simplistic and lack disciplinary cross-over, which has resulted in the exclusion of key risk factors and ultimately ignored emerging research on the importance of protective factors. An integrative theoretical approach is needed that allows for the incorporation of important risk and protective factors emerging from the more recent research on youth gang involvement.

## **What theory should be used to structure research on youth gang involvement?**

A number of criminological and sociological theories developed in the United States have been used to explain youth gang involvement as the result of macro-level (e.g., poverty, residential mobility, and ethnic heterogeneity) (e.g., Merton, 1938; Shaw & McKay, 1929) or micro-level risk factors (e.g., social interactions and processes, self-control) (e.g., Akers, 1985, 1992; Bandura, 1977; Hirschi, 1969). Both theoretical frameworks have been criticized because of a lack of disciplinary cross-over between macro- and micro-level theories (Short, 1985). This “level of explanation problem” may over-simplify and imprecisely depict the risk and protective factors associated with youth gang involvement. Although integrative accounts of youth gang membership are gaining popularity (e.g., Thornberry, 1987; Thornberry & Krohn, 2001; Thornberry et al., 2003), psychological factors that might potentially explain gang involvement (e.g. low self-esteem, a lack of empathy, exposure to trauma) continue to be over-looked. Bronfenbrenner’s (1979, 1988) social ecological model is highly integrative and encompasses multi-disciplinary theories across multiple levels of functioning (e.g., individual, peer, family, school, community), thus may have utility when examining risk and protective factors associated with youth gang membership. Similarly, Lerner’s (1991, 1995) youth positive development model, a strength-based model of adolescent development, incorporates internal (e.g., personal values, competencies) and environmental factors (e.g., support, boundaries, expectations) that enhance short- and long-term positive youth outcomes, thus may be useful in identifying factors that protect against gang involvement and promote adaptive behaviours. Although these two theories emphasize the inclusion of protective factors and strengths, what protective factors are, whether they are just the opposite of risk factors, and whether factors that protect against adolescent criminal involvement can be generalized to factors that protect against gang involvement remain unclear.

## **How should protective factors be defined?**

In general, protective factors have not been well defined and it is unclear which factors may protect against youth gang involvement. Farrington (2000) suggested that

protective factors were the opposite of risk factors (e.g., school achievement and school failure), whereas Rutter (1985) suggested that protective factors ameliorated, modified, or altered an individual's response to a risk factor (e.g., supportive relationship with a parent may buffer the adverse effects of poverty). This conceptual disagreement impacts whether protective factors are correctly identified and understood. Further confusion exists regarding the generalizability of protective factors to groups that possess certain risk factors (Stouthamer-Loeber et al., 2004). For example, studies have found that some protective factors, which normally exert protective effects on offending, have no influence on offending for psychopathic individuals (DeMatteo, Heilbrun, & Marczyk, 2005). More concerning, some of these protective factors facilitate opportunities for psychopathic individuals to engage in antisocial behaviour more successfully (Gummelt, 2010). Yet, other studies have found that some protective factors may reduce serious and violent offending across different levels of psychopathy (Salekin et al., 2010). Given the association between psychopathy and gang involvement (e.g., Dupere, Lacourse, Williams, & Tremblay, 2007; Egan & Beadman, 2011; Valdez, Kaplan, & Codina, 2000) it is important to examine whether certain protective factors will have positive or negative effects on gang involvement, as this will have important implications for the development of prevention and intervention programs.

## **How should risk and protective factors be measured?**

In the past, the assessment of risk factors in youth has been based on unstructured judgment (i.e., an expert's personal experiences and knowledge), which has been criticized for being unreliable (see Webster, Douglas, Eaves & Hart, 1997). There is current agreement that structured risk assessment methods are superior in terms of guiding decision-making when examining risk and protective factors present in youth. However, to date no instrument has been developed to measure the broad array of risk factors associated with youth gang involvement. Research has found an overlap between risk factors for gang involvement and violence (Howell, 1998), therefore contemporary violence risk assessment tools may be useful in providing a structured approach for examining risk factors associated with youth gang involvement. One noteworthy development based on the social ecological model is the construction of the Structured Assessment of Violence risk in Youth (SAVRY; Borum, Bartel, & Forth, 2006),

which examines the presence 24 risk factors and six protective factors that assess individual, peer, family, school, and community domains of functioning. Although less is known about the overlap between protective factors against youth gang involvement and youth violence, evidence has suggested that, like risk factors, protective factors against antisocial behaviour may also protect against youth gang involvement (Howell & Egley, 2005). Protective items on the SAVRY are a good starting point for systematically examining factors that may reduce the risk of gang involvement in youth, however whether the six protective factors from the SAVRY, which are dichotomously rated as absent or present, fully capture the spectrum of protective factors against gang involvement is not clear. One tool based on the youth positive development model, the Developmental Assets Profile (DAP; Search Institute, 2004), includes eight domains of internal and external assets. The use of this tool in concert with the SAVRY may provide a broader type of assessment that is necessary at this early and exploratory stage of research on protective factors against gang involvement.

## **Aim of the Study**

Bronfenbrenner's social ecological model in conjunction with Lerner's youth positive development model were used to frame this study to guide the understanding of multiple facets associated with youth gang membership in a Canadian-based sample of juvenile offenders ( $n = 112$ ). In order to examine different conceptualizations of protective factors, the definition of protective factors adopted in the current research was any factor that could directly, indirectly, or both directly and indirectly decrease the likelihood of gang involvement for a majority of youth as well as aggravate or have no effects on gang involvement in particular subgroups. This study had five overarching aims: (1) identify the risk and protective mechanisms associated with youth gang involvement across individual family, peer, school and community domains, (2) determine if there were additive effects of having multiple risk or multiple protective factors on gang involvement, (3) examine whether gang status had an influence on the frequency and timing of offending above and beyond the effects of risk and (absence of) protective factors associated gang involvement, (4) clarify whether protective factors were factors that had direct, indirect (i.e., moderating or mediating) or both direct and indirect effects on gang involvement, and (5) determine which protective factors

increase, decrease, or have no effects on the risk of gang involvement in youth with psychopathic personality traits.

## **Overview of Chapters**

The current work is comprised of eight chapters, beginning with this introductory chapter. The study begins in Chapter 2 with a discussion of youth gangs in Canada, including the history of youth gangs, scope of the problem, and the lack of intervention and prevention programs targeted to youth gangs. In Chapter 3, previous micro- and macro-level theories applied to the study of youth gangs are discussed. In this chapter, the social ecological and youth positive development models are presented and proposed as guiding frameworks for examining risk and protective factors associated with youth gang membership. In Chapter 4, established risk factors for and potential protective factors against youth gang involvement are examined. This chapter also considers definitional issues regarding protective factors, the effects of cumulative risk and protective factors on gang involvement and offending, and provides suggestions for measuring risk and protective factors associated with youth gang involvement. Chapter 5 presents an overview of the current study and the research questions. Chapters 6 and 7 contain the methodology and results sections. The concluding chapter, Chapter 8, provides an overview of the study findings and discusses implications of the current study for theory, practice, and policy, and offers suggestions for further research.

## **A Note on Terminology**

Before discussing the issue of youth gang involvement in Canada, it is important to clarify what is meant by the term *youth gang*. Within academic, government, and law enforcement communities there is a lack of a widely-agreed upon definition of a youth gang (e.g., Ball & Curry, 1995; Decker & Kempft-Leonard, 1991; Esbensen, Winfree, He & Taylor, 2001; Sullivan, 2006). Further complicating the problem, the involvement of youth in street gangs, organized crime groups, and other types of gangs has led to varying definitions of youth gangs (Royal Columbia Mounted Police, 2006). For example, in Canada, three or more people committing a crime together is considered a 'gang-related' crime (Wortley, 2010). Given that most youth crime is committed amongst

groups, having a definition of 'gang' that only takes into consideration the number of co-offenders may inflate the number of actual gang-related crimes. To address this issue, scholars working as part of the Eurogang Program, have defined a youth gang as "any durable, street-oriented youth group whose own identity includes involvement in illegal activity" (Klein, Weerman, & Thornberry, 2006, p. 418). Thus, when the term youth gang is used in this paper this is to refer to youth who have a shared identify which includes criminal activities.

## **Chapter 2. Youth Gangs in Canada**

Although youth gangs are not a new social problem in Canada (see Girad, 1992; Young, 1993), public concern over recent violence perpetrated by youth gangs has led to increased efforts by researchers and policy makers to develop solutions to reduce youth gang involvement and gang-related activity. The first part of this chapter describes the history of youth gangs in Canada and the rise of youth gang membership and gang-violence over the past decade. The second part of this chapter discusses limitations of previous approaches that have been used to combat the issue of youth gangs in Canada, including the overreliance of law enforcement suppression techniques and the underuse of intervention and prevention strategies. The last part of this chapter examines the work of research on youth gangs in Canada, highlighting the deficiencies in the Canadian knowledge base regarding risk and protective factors, which are critical to the development of evidence-based intervention and prevention strategies.

### **History of Youth Gangs in Canada**

Youth gangs have had a long history in Canada and the United States. Youth gangs have existed in the United States since at least the 1920s (Thrasher 1927). Although it is less clear when youth gangs first emerged in Canada, there is some evidence to suggest that youth gangs have existed in Vancouver since the early 1900s (Young, 1993). Similar to the United States, gangs in Canada first flourished during the industrial era due to shifts in the population and rising immigration rates (Finestone, 1976). Early North American gangs were composed largely of youth from disadvantaged European ethnic groups (e.g., Irish, Italian, and Jewish immigrants) leading researchers to believe that youth gangs, in part, resulted from the experience of cultural alienation and limited opportunities to obtain money and status through legitimate means (Howell & Moore, 2010). Intermittent periods of heightened activity over the next seventy years resulted in the recognition that youth gangs also appeared during times of rapid social change and political upheaval (Spergel, 1990). Nationally, the number of youth gangs

increased in the 1970s due to increased mobility and access to illegal weapons, and again in the 1980s and 1990s due to increased involvement in drug trafficking (Battin-Pearson, Thornberry, Hawkins & Krohn, 1998; Fagan, 1990; Miller, 1992), particularly the rise of the “entrepreneurial organization crack cocaine epidemic” (Sanchez-Janowski, 1991, pg. 71). Over time, shifts in patterns of immigration into Canada have led to assertions that gang activity was more concentrated among Asian, South Asian, and Middle Eastern minority ethnic groups (Totten, 2008). Economic disadvantage in the 1990s and 2000s also created the structural basis for many Aboriginal based youth criminal organizations (Hagedorn, 2002). Over the past decade, access to United States and international drug trafficking routes for both supplies and markets has led to another period of increased gang activity (Corrado, 2011).

## **Scope of the Current Problem**

The magnitude of the youth gang problem is difficult to assess due to inconsistent definitions of gang involvement used by academics, policy makers, and the police. Nonetheless, available estimates suggest that rates of youth gang involvement in Canada have been increasing over the past few decades (Public Safety Canada, 2007). Since 1998, the number of identified gangs increased from an estimated 430 youth gangs, comprised of 7,071 members (Astwood Strategy Corporation, 2004) to 344 youth gangs with 11,900 active members (Criminal Intelligence Service Canada, 2006). Based on these statistics, this suggests that youth gang memberships have increased at a rate of 1,000 memberships per year. Although the decrease in number of youth gangs may be used as evidence for the effectiveness of zero tolerance policies and police suppression tactics, when considering that gang membership increased, the decrease in number of youth gangs is particularly alarming. In effect, youth gangs may be becoming larger and more organized. Further, gang involvement is starting much earlier than previously anticipated. Based on data from the early 1990s, Hamel et al. (1998) indicated that the average age of gang youth was approximately 18 years. However, Craig et al.’s (2002) review of more recent data suggested that youth typically became gang members by the age of 13 or 14. Due in part to police suppression tactics within large urban areas, some Aboriginal youth gangs have relocated to rural areas and Aboriginal reserves (Criminal Intelligence Service Saskatchewan, 2005). Gang networks

expanding in number and terms of geographic territory has facilitated the acquisition of more dangerous weapons, such as firearms. Consequently, youth gang violence, particularly assault and homicide, has increased due to the growing availability of firearms (Astwood Strategy Corporation, 2004; Hamel et al., 1998).

## **Response to Youth Gangs and Gang-Related Violence**

Historically in Canada, resources for reducing youth gang involvement have been directed to gang suppression (or social control) strategies. These responses have focused on identifying persistent offenders, aggressively enforcing laws (Chettelburg, 2007), and increasing penalties for involvement in gang violence (e.g., arrest, incarceration, fines) (Hall, Thornberry, & Lizotte, 2006; Klein & Maxson, 2006). For example, in 2009, amendments to anti-gang legislation in the *Canadian Criminal Code* introduced mandatory minimum sentences for murders linked to organized crime and drive-by shootings. In 2013, parliament passed *Bill C-394*, which set mandatory minimum sentences of six months in jail for individuals under the age of 18 who were found promoting gang recruitment, participating in gang activities, or charged with gang-related offences.

Despite their intuitive appeal in reducing gang-related crime, a number of criticisms have been raised about the sole use of suppression techniques to address the youth gang problem. First, several authors have argued that suppression techniques may potentially increase the risk of youth joining gangs. Aggressive police activity can increase cohesion among gang members and the attractiveness of gangs to vulnerable youth (Chettleburg, 2007; Decker, 2004; Wortley & Tanner, 2005). Second, grouping first-time high-risk youth together can lead to more entrenched antisocial and criminal behaviour (Totten, 2008). These first two criticisms are most evident in the fact that the genesis of several Canadian gangs can be traced to youth custody and adult correctional facilities. Third, suppression techniques fail to address important psychosocial issues faced by youth gang members, such as a history of abuse, victimization while in the gang, mental health and substance abuse problems, and difficulties with education and employment. Further, based on the concept of cumulative disadvantage, each cycle of release and imprisonment reduces informal social control and increases the likelihood of recidivism (e.g., Sampson & Laub, 2003). Studies

conducted in the United States have found that incarceration is ineffective in reducing criminal and gang-related behaviour (Aos, Miller, & Drake, 2006) and may even increase the chance of recidivism and length of gang membership (Benda & Tollet, 1999; Olson, Dooley, & Kane, 2004). For example, one study in the United States found that incarceration was a stronger predictor of reoffending than gang membership (Benda & Tollet, 1999). Similarly, in a sample of approximately 2,000 incarcerated gang and non-gang members in Canada, Nafekh and Stys (2004) found that incarcerated gang members were more likely to reoffend violently than incarcerated non-gang offenders, controlling for demographic characteristics and criminal history. Andrews and Bonta (2010) have suggested that the greatest contribution of increasingly punitive approaches to youth (gang-involved) offenders is the increased cost of incarceration. Given Canada's parliament's implementation of more crime-control oriented policies such as Bill C-394, this cost is likely to continue to rise. Most importantly, given national surveys indicating significant increases in the overall number of youth gang members and stable rates of gang-related homicides (Boyce & Cotter, 2013), suppression-based approaches do not appear to be working. This is consistent with the literature that has argued overreliance on one strategy over another is unlikely to produce major changes in the severity of a community's gang problem (Curry & Decker, 2003; Wyrick & Howell, 2004).

Several authors have suggested that policies with the best outcomes combine suppression, prevention, and intervention strategies (Spergel, Wa, & Sosa, 2005; Wyrick, 2006; Wyrick & Howell, 2004). Unlike suppression strategies that are aimed at the punishment of existing gang members, prevention strategies target individuals and groups identified as being at greater risk for gang involvement. Rather than target these groups by increasing surveillance or other techniques that may result in labelling effects, the goal of prevention policies is to reduce risk factors while promoting protective factors. Intervention strategies target youth gang members and recruits to provide strategies to exit out of gangs and support these youth after their exit. Preventing youth from joining gangs appears to be the most cost-effective strategy (Howell, 1998). Potential benefits of these programs include reduced financial costs to society through decreased public spending on incarceration and correction supervision as well as safer communities. In response to recommendations made in the literature, a recent focus in Canada has been placed on Crime Prevention through Social Development (CPSD) initiatives. CPSD seeks to reduce factors that place young people at risk, while simultaneously enhancing

factors that can provide protection for individuals and their communities (Totten, 2008). However, as illustrated below, the existing research has given these policies little guidance regarding which risk factors should be addressed and which protective factors should be emphasized.

## **Gaps in Extant Research**

Effective prevention and intervention measures require a sound knowledge of the risk factors for and protective factors against entry into gangs. However, these factors have not been well studied in Canada. Most of the research on Canadian gangs has been conducted in the past 20 years and is based on extremely small samples (e.g., Mathews, 1993) or has used qualitative methods (Baron; 1997; Delbert & Norman, 1980; Nafekh, 2002; Young & Craig, 1997). While a number of federally funded projects and several MA theses and PhD dissertations on gangs or gang-related topics have begun to emerge over the past decade, these have tended to focus on demographic and offending characteristics of gang members (e.g., Barron & Tindall, 1993; Gordon & Foley, 1998; Kelly & Caputo, 2005; Lynn, 2014; Spindler, 2009), rather than specific risk factors for and protective factors against youth gang involvement. In one study of gang and non-gang youth from disadvantaged neighbourhoods in Montreal, Le Blanc and Lanctot (1998) found that gang-involved adjudicated youth offenders were more likely to have social and emotional problems whereas non-gang youth had higher levels of parental supervision and less stress in school. However, the identification of youth with one or two risk or protective factors provides little information to properly discriminate youth at risk and not at risk for gang involvement (e.g., Esbensen et al., 2010; Thornberry et al., 2003).

As a result of this gap in knowledge, much of what is known has been derived from the large body of research conducted in the United States. Although the United States and Canada are economically similar, the most disadvantaged neighbourhoods in the United States are characterized by higher levels of crime, income inequality, absolute poverty, and gun availability than the most disadvantaged neighbourhoods in Canada (Marmot, 1998; Miller, Azrael, & Hemenway, 2013; Oreopoulos, 2008). Further, unlike the United States where members of criminal gangs are drawn mainly from the economic underclass, the involvement of youth in gangs in Canada cuts across

all income categories, including lower-, middle-, and upper-income individuals (Begin, 1994). For example, one of the largest youth gangs in British Columbia, the “856 gang” is comprised mainly of middle-class youth from a suburban city (Bouchard & Konarski, 2013). As such, the extent to which findings from studies in the United States can be generalized to explain gang involvement in Canada is unclear.

Despite these macro-level differences associated with youth gang involvement, individual-level factors that explain gang involvement and gang-related offending in the United States may still have relevance for Canadian research and policy. For example, Esbensen and Weerman (2005) compared youth gangs in the United States and the Netherlands. This comparison of youth gangs indicated few differences across nations with respect to the frequency and types of antisocial activities that the gangs engaged in, as well as the types of risk factors present in the participants (e.g., impulsivity, risk-seeking, peer delinquency; Esbensen & Weerman, 2005). Given that at least some of the extant research from the United States regarding gang involvement at the individual-level may be generalizable to Canada, existing theories developed to explain gang involvement in the United States may provide a helpful framework for Canadian research. Moreover, although gang members in Canada come from middle- and upper-class backgrounds (Begin, 1994), those from the most marginalized groups represent the majority of youth gang members (Chettleburgh, 2003; Criminal Intelligence Service Canada, 2006). Some of these gangs are also modeled after gangs in the United States. Thus, there may be at least some lessons to be learned from macro-level theories from the United States.

## **Chapter 3. Theoretical Frameworks**

The sociological and criminological literature developed in the United States has traditionally provided the foreground in understanding the etiology of youth gangs. Over the past century numerous theories have been applied to examine youth gang involvement as a result of macro-level (i.e., community) or micro-level (i.e., individual) factors. These theories have advocated for isolated efforts to target a single risk factor or a single domain of risk factors, however focusing exclusively on risk factors in one domain (e.g., individual or community) will neglect important risk factors in other domains (Klein & Maxson, 2006, O'Brien et al., 2013). As such integrative models that address multiple factors have gained conceptual importance. The following chapter is organized into three sections. The first section discusses macro-level theories that have been applied to youth gangs. The second section discusses micro-level theories. These latter two theoretical frameworks are critiqued due to a lack of disciplinary cross-over that has resulted in only partial explanations of gang involvement. As a response to this imprecise explanation of gang involvement, the third section of this chapter discusses the need for an integrative and comprehensive approach to research on youth gang involvement. Two conceptual frameworks to explain theories of risk and protective factors are proposed.

### **Macro-Level Theories of Gang Involvement**

Macro-level theories of gang involvement link structural characteristics of communities to variations in the rate and distribution of gang involvement and gang-related violence (Bernard & Snipes, 1996). These types of theories are founded on three assumptions: (1) gang involvement is the result of individual choice, but this choice is constrained and inspired by the immediate environment, (2) the immediate environment is structured so that important characteristics are causally related to the broader structural features of social organization, and (3) gang members are essentially similar to non-gang members in the processes by which they interact with the environment and

in the motives that direct their responses to that environment (Bernard & Snipes, 1996). With respect to this last assumption, macro-level theories hold that there is nothing inherently different between criminals and non-criminals except for the presence of environmental factors that have influenced individuals' beliefs that it is beneficial to join gangs. However, it is unclear whether this assumption is an empirical reality or if this assumption was made for the sake of parsimony or due to a reluctance to engage in disciplinary cross-over.

In the early 20th century, Shaw and McKay's (1929) study of social disorganization and Merton's (1938) study of anomie emerged as two major macro-level criminological paradigms that sought to explain high crime rates within inner-city neighbourhoods (Shaw & McKay, 1929), especially in the United States (Merton, 1938). Both social disorganization and anomie/strain assert that economic disadvantage is a primary cause of crime. Shaw and McKay (1942) proposed that social disorganization, defined as poverty, urbanization, residential mobility, family disruption, and ethnic heterogeneity, is the key contributing factor to the formation and maintenance of crime. In areas characterized by social disorganization, there is a breakdown of conventional social institutions (e.g., school, church, family) that operate as social controls for deviant behaviour. In support of social disorganization theory, research conducted in the United States has found that gangs form in more economically disadvantaged areas (e.g., Decker & Van Winkle; 1996; Hagedorn, 1988; Sanchez-Jankowski, 1991; Venkatesh, 1997). However, not all disadvantaged communities produce gangs (e.g., Katz & Schnebly, 2011) and gang activity has been observed in ethnically homogenous suburban and rural areas (e.g., Goldstein & Soriano, 1994; Hethorn, 1994; Martin, 1997; Ralph, Colopy, McRae & Daniel, 1995; Spergel & Curry, 1993).

Similar to social disorganization theory, strain/anomie theory holds that crime occurs in impoverished areas, but that it is the result of a discrepancy between society's emphasis on economic success and the ability of individuals in disadvantaged neighbourhoods to access legitimate means to obtain such success (Merton, 1938; Messner & Rosenfeld, 2007). The central concept of strain theory is that a society sets collective goals for its population (e.g., the "American Dream") and then offers the ability to achieve such goals to only a limited number of individuals (i.e., the middle- or upper-class). Gangs are believed to compensate for strain by providing illegitimate means to

achieve goals that individuals are not otherwise capable of achieving due to limited education and employment mobility (Klemp-North, 2007). Research has confirmed that deviance acts as coping mechanisms for unattainable goals (Eitle, Gunkel, & van Gundy, 2004); however, strain theory does not explain why many lower class youth do not join gangs (Goldstein, 1991) or become criminals (Webster, MacDonald & Simpson, 2006) even though their socioeconomic status remains static. It would seem that social disorganization and strain theory overestimates the effects of community characteristics on gang formation.

As alluded to earlier, the scope of macro-level theories may be too narrow to explain youth gang involvement in Canada. Macro-level studies of youth gangs have generally sampled from large cities in the United States, such as New York, Los Angeles, Pittsburgh, Denver, Seattle and Chicago (e.g., Asbury, 1927; Block & Block, 1993; Hill, Howell, Hawkins & Battin-Pearson, 1999; Huizinga et al., 1998; Hutson et al., 1995; Lahey et al., 1999). In Canada, many youth gangs are formed on Aboriginal reserves, which are structurally dissimilar from large cities in the United States. Furthermore, although the majority of gang members in Canada come from groups that suffer from high levels of inequality, disadvantage and social marginalization (Chettleburgh, 2003; Criminal Intelligence Service Canada, 2006), rates of crime, poverty, and unemployment are much less severe than those in the United States (DeKeseredy, 2003) and gang members have been found to arise from a variety of socioeconomic neighbourhoods (Chettleburgh, 2003; Criminal Intelligence Service Canada, 2006). Thus, social disorganization and other macro-level explanations of gang involvement and gang-related crime from large urban centres in the United States may not be generalizable to Aboriginal reserves and Canadian cities that do not have the same degree and severity of social disorganization (see DeKeseredy, 2003). Integrating micro- and macro-level theories may also be necessary, as some macro-level factors may be aggravated by important micro-level factors.

## **Micro-Level Theories of Gang Involvement**

Micro-level theories of gang involvement attempt to explain why some individuals from the same community join gangs whereas others do not. Micro-level theories of gang membership link individual-level characteristics to the probability that an individual

will join a gang (Bernard & Snipes, 1996). Micro-level theories of gang involvement are based on three primary assumptions: (1) differences in the probability of gang involvement can be explained by differences that are attributed to the individual, (2) individual differences may be explained by interactions with other people within the individual's environment, and (3) gang members are different from non-gang members in some measurable way (Bernard & Snipes, 1996).

Two micro-level theories, social bond theory (Hirschi, 1969) and social learning theory (Akers, 1985, 1992; Bandura, 1977), have commonly been applied to the issue of youth gangs. Hirschi's (1969) social bond theory builds upon Emile Durkheim's (1897, 1951) individualization route to crime, which suggests that moral behaviour and attachment to others are intertwined. According to social bond theory, deviant behaviour occurs when the socialization that holds one's basic human nature in check is incomplete or faulty. This occurs when bonds to others are weakened, thus influencing an individual to engage in self-interested behaviour that deviates from conduct that is legal or appropriate. Hirschi (1969) postulated four interrelated components that bond the individual to society: attachment (i.e., affective relationships with others), commitment (i.e., participation in conventional activities), involvement (i.e., frequent participation in conventional activities), and belief (i.e., sensitivity to the expectations, norms and values of society). Within this framework, youth who lacked attachment to others, were uncommitted to long-term socially approved goals, uninvolved in conventional activities, and did not believe in the morality of the law were more likely to become gang-involved than those with bonds to conventional society (Dukes et al., 1997).

Research on youth gangs has generated support for the basic tenets of this theory (e.g., Friedman, Mann, & Friedman, 1975; LeBlanc & Lanctot, 1998; Thornberry, 1998); however, the utility of Hirschi's ideas have been questioned. For example, Hughes and Short (2005) found that many gang members also spend a great deal of their time engaged in conventional pursuits, such as taking part in sports or making plans for the future. In addition, Esbensen, Huizinga, & Weiher (1993) found that an involvement in conventional activities did not deter youth in high-risk neighbourhoods from engaging in delinquent behaviour or differentiate gang members from other delinquent youth. In effect, failure to consider how macro-level factors moderate the

relationship between involvement in conventional activities and gang involvement has resulted in this theory's inability to explain youth gang involvement in the types of neighbourhoods that are most likely to consist of gang-involved youth.

The second micro-level theory applied to gangs, social learning theory, posits that positive and negative social mechanisms work to condition an individual toward or away from crime (Akers, 1985, 1992; Bandura, 1977). As part of this theory, future behaviour is acquired or conditioned by the effects or past consequences that the behaviour has had on the person's environment, either through reinforcement or punishment. When behaviour is punished, an individual is discouraged from engaging in the conduct again, but when a behaviour is rewarded, an individual is encouraged to engage in the conduct again. Within this theory, gang membership is believed to occur when an individuals' environment positively reinforces gang involvement and gang-related activity (e.g., in-group approval, money, increased social status, power) and a lack or absence of punishment (e.g., low peer or parental disapproval).

One major criticism of social learning theory, however, is that it does not take into account neighborhood context (Jeffery, 1990). Social learning theory is largely based on the premise that deviant and criminal conduct is learned and sustained via associations with family and the peer network; however, neighbourhood characteristics such as poverty may influence the presence of reinforcers (e.g., norms in favor of crime) and punishers (e.g., availability of police, social control) in the environment. Clearly, it is not just individual and social processes that are important in understanding risk for gang affiliation, but also the community structural characteristics as well. Given that youth tend to operate within overlying networks of peers, families, neighbourhoods, and communities (Cochran et al., 1993; Fischer, 1982; Mueller & Elder, 2003), consideration of risk and protective factors across multiple levels is required.

## **Moving Past a 'Level of Explanation' Problem: Integrative Frameworks**

Consistent with the view that human behaviour is complex and multifaceted, neither macro- nor micro-level theories can fully explain youth gang involvement. In support of this argument, recent studies have illustrated that individual gang involvement

is not the result of a single set of risk factors, but rather is the product of accumulated risk (e.g., Bjerregaard & Smith, 1993; Esbensen & Huizinga, 1993; Gordon, Loeber, Stouthamer-Loeber, & Farrington, 1999; Hill, Howell, Hawkins, & Battin-Pearson, 1999; Thornberry et al., 2003). This risk can be accumulated through individual-level factors. For example, intellectual deficits or learning disabilities at school can lead to low achievement, teach frustration, ostracization from prosocial peers, and attachment to a negative peer network (Bjerregaard & Smith, 1993; Craig, Vitaro, Gagnon, & Tremblay, 2002; Hill et al., 1999; Thornberry et al., 2003). Risk can also be accumulated through macro-level factors. For example, a low-income neighbourhood may have high residential mobility and thus low collective efficacy, leading to higher crime rates, and an increased risk of victimization that makes protection that comes from gang involvement appealing (Bjerregaard & Lizotte, 1995; Hill et al., 1999; Thornberry, 1998; Thornberry et al., 2003).

Integrative frameworks that emphasize incorporating multiple risk factors have gained at least conceptual importance in the development of gang theory. More recently, Thornberry explained in his adaption of interactional theory to youth gangs (Thornberry, 1987; Thornberry & Krohn, 2001; Thornberry et al., 2003) that gang membership was a result of a bidirectional relationship between the individual, social structures (i.e., peer, family, school, and community environments), weakened attachments to prosocial individuals, and a learning environment that promotes and reinforces delinquency. In contrast to other theories applied to gang membership, interactional theory employs a holistic approach, combining Hirschi's (1969) social control theory and social learning theory. According to interactional theory, gang membership may result from three different processes: selection, facilitation, or enhancement. Through the selection process, gangs select and recruit members who are already involved in delinquent behavior. Through the facilitation process, gangs provide opportunities for delinquency to youth who were not delinquent beforehand (Gatti, Tremblay, Vitaro, & McDuff, 2005; Gordon et al., 2004; Thornberry, Krohn, Lizotte, & Chard-Wierschem, 1993). Through the enhancement process, both selection and facilitation processes are operating (Thornberry et al., 1993), where gang members are recruited due to their involvement in prior delinquent behaviour, and in turn this gang involvement facilitates an increased propensity for delinquent behaviour (Gatti et al., 2005).

Although there is both growing evidence and enthusiasm for an interactional explanation of gang involvement (e.g., Gatti et al., 2005; Gordon et al., 2004), interactional theory pays little attention to the personality-level influences involved in gang membership, instead noting individual differences between gang-members have to do with length of gang membership and degree of offending while in the gang. This is problematic because research now indicates that personality traits, such as impulsivity, hyperactivity, self-esteem, empathy, and a history of trauma are relevant to youth gang membership (e.g., Alleyne & Wood; 2010; Dupere et al., 2007; Esbensen & Weerman, 2005; Klein & Maxon, 2006) and may moderate the relationship between neighbourhood characteristics and gang involvement (see Dupere et al., 2007). These personality characteristics have implications for how the process of gang involvement develops. For example, hyper-masculine individuals with a sense of bravado and a proclivity for risk-taking behaviour may portray desirable characteristics that result in their selection into gangs. In contrast, individuals with higher levels of anxiety or attachment issues due to disruptive familial backgrounds and a history of victimization may be more likely to actively seek gangs that offer a sense of family, protection, and facilitate their own delinquent behaviour. From a protective factor perspective, youth with self-confidence and high levels of prosociality may be more resilient to selection processes. As such, although interactional theory is a strong step forward in providing a more comprehensive explanation of gang involvement, guidance from the psychological literature is needed.

In the 1970s, developmental psychologist Urie Bronfenbrenner (1979, 1988) recognized the restricted scope of developmental psychology. In response, he emphasized that research questions should be addressed from multiple levels, multiple methods of analysis, and through multiple theoretical perspectives. As part of his emphasis, Bronfenbrenner constructed a social ecological model that not only emphasizes personality-based individual-level characteristics, but also the individual's social environment and how their personal characteristics interact with their environment. This emphasis on personality traits while simultaneously attending to an individual's broader social environment makes this model particularly suited to addressing the abovementioned critique of interactional theory. Similar to interactional theory, a central tenet of social ecological theory is that problem behaviour is influenced by ongoing qualities of an individual's social environment and the interaction between the social environment and that individual's personal characteristics (Bronfenbrenner,

1979, 1988). This analysis places an individual at the center of micro-, meso-, exo-, macro-, and chrono-system levels (see Table 1). Within each of these ecological settings, individuals are exposed to risk factors that increase the likelihood of negative outcomes and protective factors that decrease such outcomes. This includes a wide range of factors, such as individual-level psychological factors, interactions with peers, family and teachers, community structural characteristics, and historical factors.

**Table 1. Bronfenbrenner’s Social Ecological Model**

<b>System</b>	<b>Definition</b>
Microsystem	Environment in which the youth resides, includes family members, peers, and other individuals the youth has contact with.
Mesosystem	Interactions between the microsystems and the youth (e.g., victimization at school).
Exosystem	System which impacts the microsystems the individual is a part off (e.g., parent laid off increasing stress level at home).
Macrosystem	Cultural effects on the society in which the youth lives (e.g., cultural norms supportive of violence).
Chronosystem	Cumulative experiences the youth has over the course of their lifetime (e.g., history of maltreatment) and the history of the surrounding environment (e.g., mistrust of police).

An ecological systems analysis has recently been used to understand youth violence (e.g., Cairns & Cairns, 1994; Espelage & Swearer, 2003; Garbarino, 2009; Verlinden, Hersen & Thomas, 2000), and several authors have recommended an ecological perspective when studying the etiology of youth gang membership (Elliott, 1994; Evans & Mason, 1996; Tolan & Guerra, 1994). Given the limitations of existing frameworks for gang research, the social ecological model provides a comprehensive framework from which researchers can draw to study youth gangs. However, one weakness of the ecological model is that while it does incorporate a broad spectrum of risk and protective factors, it is mainly concerned with explaining negative youth outcomes, rather than the development of positive behaviours. In other words, although protective factors are used to explain why individuals are not involved in gangs, the manner in which these protective factors can be instilled in youth to prevent gang involvement is less clear.

Due to “dissatisfaction with a predominant view that underestimated the true capacities of young people by focusing on their deficits rather than their development potential” (Damon, 2004, pg. 13) new frameworks emerged that focused on the positive development of youth. Rather than emphasizing risk factors and deficits to explain why youth engaged in problematic behaviour, these approaches took a strength-based approach, focusing on positive factors that contributed to positive development and facilitated the adoption of healthy behaviours to help ensure a prosocial transition into adulthood. Emerging from this movement was the youth positive development model (Lerner, 1991; 1995), which emphasized the “Five C’s” of healthy development – competence, confidence, connection, character, and caring. Similar to the social ecological model (Bronfenbrenner, 1988), the youth positive development model uses a comprehensive approach to identify protective factors, asserting that development occurs within nested, interdependent, and overlapping systems (e.g., individual, peer, family, school, community). Strength-based approaches have been used in offender rehabilitation (e.g., Whitehead, Ward & Collie, 2007) and have been argued to have utility when studying youth gangs (O’Brien, et al., 2013). There is also some evidence that developmental assets (e.g., commitment to learning, interpersonal support) are associated with positive developmental outcomes among gang youth (Taylor et al., 2002; 2004). Thus, integrating the social ecological model (i.e., considering positive and negative dimensions of multiple contexts that contribute to youth gang involvement simultaneously) and youth development model (i.e., focusing on both problem and competent behaviours) when studying gangs will provide an understanding of factors related to reducing youth gang involvement and increasing positive youth outcomes.

## **Chapter 4. Risk and Protective Factors for Youth Gang Involvement**

Most theories of youth crime, including youth gang involvement, are not 'wrong', just 'incomplete' (Walsh, 2002). For research on gang involvement, a particular theoretical framework may be helpful for identifying the origins of a problem and guiding the incorporation of specific types of risk and protective factors; however, neglecting emerging risk and protective factors identified in more recent literature would severely limit the explanatory power of this research. If these factors are neglected, policy solutions ultimately suffer. As detailed above, although some existing theories on gang involvement may be more comprehensive than others, the scope of these theories is still limited due to the exclusion of important risk and protective factors. This is especially true for protective factors, as their importance has emerged well after most of the theories that currently guide research on gang involvement were developed. With the exception of Hirschi's (1969) social bond theory, most criminological and sociological theories applied to the study of youth gangs have focused exclusively on risk factors or deficits to explain why youth join gangs. Although this approach has substantially enhanced knowledge of gangs, gang members, and gang crime, it provides a one-sided view concerning why some youth join gangs, while others do not (see Lösel & Farrington, 2012).

Over the past decade, research has increasingly turned to the enhancement of protective factors in youth, in part, due to lessons learned in the violence and delinquency prevention literature. Despite this increasing attention, protective factors are still not well understood. In the current chapter, established risk factors for and potential protective factors against gang involvement are discussed. In the first section, an overview of major findings from the research on risk factors for youth gang involvement is provided, including a summary of established risk factors in individual, peer, family, school, and community domains. In the second section, conceptual issues regarding the identification of protective factors are presented. Drawing from the violence literature, a

number of factors that may have a protective effect on youth gang involvement are examined. In the third section, the effects of cumulative risk and protective factors on gang involvement and offending are discussed, as well as how risk and protective factors can be measured using a structured approach. In the fourth section, a summary of the rationale for the current work is provided, and novel contributions of the current research are discussed.

## **Risk Factors for Youth Gang Involvement**

Risk factors have been consistently defined in the literature as “characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected at random from the general population, will be more vulnerable to negative outcome” (Mrazek & Haggerty, 1994, pg. 12; also see Clayton, 1992; Hawkins, Catalano, & Miller, 1992). In the past, research focused on a single variable or a single set of variables when studying why youth join gangs. Currently, because there is no accepted single risk factor for gang involvement, research has expanded to simultaneously examine risk factors from individual, peer, family, school, and community domains. Recent research also highlights considerable overlap between the risk factors for gang involvement and violence, suggesting that few risk factors are uniquely associated with gang membership (Esbensen, Peterson, Taylor, & Freng, 2009). Although there are no risk factors that uniquely predict gang membership, research has consistently demonstrated that gang-involved youth possess a higher number of risk factors than non-gang youth (Esbensen et al., 2009; Hill, Lui, & Hawkins, 2001; Howell & Egley, 2005). This implies that gang involvement results from cumulative disadvantage (Sampson & Laub, 2003) rather than as a pathway that is qualitatively different from involvement in other forms of offending. Major risk factors for gang involvement, including individual, family, peer, school, and community domains, are discussed below. The relationship between these risk factors and violence is not discussed, as detailed reviews are provided elsewhere (e.g., Hawkins et al., 1998; Lipsey & Derzon, 1998).

## **Individual Risk Factors**

Individual factors such as prior delinquency (Esbensen 2000; Hill et al., 1999; Klein & Maxson, 2006), antisocial attitudes (e.g., negative views of the police, positive attitudes towards gangs and violence; Esbensen, 2000; Esbensen et al., 2009; Friedman, Mann, & Friedman, 1975; Hawkins et al., 2009), a history of aggressive behaviour (Dahlberg, 1998; Sanchez-Jankowski, 1991), a proclivity for excitement and trouble (Esbensen & Weerman, 2005), alcohol and drug use (e.g., Bjerregaard & Lizotte, 1995; Fagan, 1990; Lizotte, Tesoriero, Thornberry, & Krohn, 1994), and non-delinquent problem behaviours (e.g., hyperactivity, reactivity, impulsivity, anger management problems) (Hill et al., 1999; Kosterman et al., 1996) increase the likelihood of youth gang involvement. Although research into gang involvement has been largely influenced by theories from criminology and sociology (Bennett & Holloway, 2004), psychological variables such as learning difficulties (Hill et al., 1999), high levels of anxiety, hyperactivity, mental health problems, history of suicide attempts (Dukes, Martinez, & Stein, 1997; Yoder, Whitbeck & Hoyt, 2003), low levels of empathy and remorse (Dupere et al., 2007), and the experience of traumatic or negative life events (e.g., Klein & Maxson, 2006) have been suggested to influence an inclination for gang membership.

## **Peer Risk Factors**

Involvement with a delinquent peer group, especially having friends who are gang-involved, is consistently related to gang involvement (Curry & Spergel 1992). Involvement with antisocial peers limits opportunities for the development of prosocial peer networks that promote desistance from gangs and delinquency (Pyrooz, Sweeten & Piquero 2012). Further, commitment to delinquent peers may facilitate and reinforce antisocial beliefs (Esbensen, Huizinga, & Weiher, 1993; Fagan 1990; Maxson, Whitlock & Klein, 1998). Peer rejection, especially by prosocial peers, and a lack of positive peer support, can increase gang involvement, as rejected and isolated youth may join gangs for a sense of belonging (Totten, 2000; Wortley & Tanner, 2005). More recently, social network analysis has been used to examine how different measures of connections to other antisocial or gang-involved peers (e.g., degree or betweenness centrality [i.e., the relative position of the individual within a social network]) can be used not only to identify gang membership, but also to identify the magnitude of an offender's embeddedness within the gang (e.g., Papachristos, 2006).

## **Family Risk Factors**

Family functioning has consistently been among the strongest predictors for gang involvement (Loeber & Dishion, 1983; McCord, 1991). Family factors such as poor parental monitoring and weak attachment to family have been found to increase the risk of gang affiliation (Maxson, Whitlock & Klein, 1998). In addition, retrospective studies of the family histories of gang members have reported elevated levels of marital discord, child maltreatment, and family trouble with the police (Moore, 1978, 1991). Further, youth with a lack of parental role models or who have parents who express favorable attitudes toward antisocial behaviour are more likely to join a gang (Wang, 1995).

## **School Risk Factors**

Academic failure and low commitment and achievement in school have been linked to gang membership (Bowker & Klein, 1983; Thornberry et al., 2003). It has been argued that gang involvement is the result of school frustration and failure. As gangs offer youth opportunities for respect, status, and material possession more than conventional means (Hallsworth & Young, 2004), youth may see little value in education, especially when past school experiences have been negative (Howell & Egely, 2005).

## **Community Risk Factors**

It has become increasingly clear that community structural characteristics have important implications for risk and development (Sampson, 1997). Gangs tend to thrive in disadvantaged neighbourhoods, characterized by high rates of poverty, residential mobility, and easy access to drugs and weapons (Curry & Spergel, 1988, 1992; Hagedorn, 1994a; 1994b). However, findings with respect to community-level risk factors have been mixed. In the Rochester Study of Youth Development, Bjerregaard and Smith (1993) longitudinally examined social disorganization and poverty, however neither were found to be significantly related to gang membership.

## **Protective Factors against Youth Gang Involvement**

Compared to risk factors, protective (i.e., promotive, buffering, or resilience) factors have received considerably less attention in the literature. This is largely the

result of definitional issues and ambiguity regarding what a protective factor is. The extensive use of different terms across disciplines, researchers, clinicians, and policy makers to describe factors that decrease the likelihood of negative outcomes has resulted in a lack of clarity regarding the initial intention of the term 'protective factor' (Cowan, Cowan, & Schulz 1996). At a linguistic level, protection, resiliency and buffering are simply different terms for individual or environmental characteristics that reduce the likelihood of negative outcomes. However, what is less clear is the mechanism by which protective factors operate. Some explanations have suggested that protective factors have direct effects on a negative behaviour (i.e., an inverse association with an adverse outcome). However, by this definition, a protective factor is simply the opposite of a risk factor. For example, if school failure is a risk factor, academic success should be a protective factor. Other explanations suggest that because protection, by definition, is a process that reduces the effect of risk, it must be entirely conceptually different from risk. Rather than simply occupying the opposite end of the continuum, a protective factor is a factor that moderates or mediates the effect of risk factors on a negative outcome. For example, while many gang members come from low-income neighbourhoods, not all of these youth join or are attracted to gangs. Despite risk factors in the youth's environment, there may be other factors, such as a loving and supportive relationship with a parent, which promote resilience in the youth that diminishes the allure of gang involvement. Such factors may operate differently for youth exposed and not exposed to risk (i.e., when few or no risk factors are present, protective factors may have no effect). In addition, the absence of a protective factor may account, in part, for the relationship between risk factors and gang involvement (e.g., a youth with anger management issues may be less likely to have a loving and supportive relationship with a parent thereby increasing their likelihood of gang involvement). It is also possible, and perhaps likely, that a protective factor has both direct and indirect effects on the reduction of problem behaviour (Fraser, 1997; Lutharand & Zigler, 1991; Masten & Coatworth, 1998; Rutter, 1987). For example, achievement in school may deter youth from joining a gang because they do not want to jeopardize their chances of obtaining a higher education or getting a good job. Similarly, factors that increase risk of delinquency and gang involvement, such as a history of abuse and maltreatment, may be buffered by the relevance of school achievement for successful adjustment (Bender & Losel, 1997).

In addition to the definitional issues outlined above, it also unclear if a protective factor in one context operates as a risk factor in another. For example, for some individuals, strong attachment and bonds to parents may decrease the risk of gang involvement. However, if a youth's parents are gang members, attachment to parents may increase the risk of the youth subsequently joining a gang. Similarly, factors that are normally protective in some groups may increase risks in others, regardless of context. Over the past few decades, psychopathy has emerged as an important construct in the study of criminal and violent behaviour (e.g., Coid et al., 2006). Compared to non-psychopaths, individuals with psychopathy are described as more callous, manipulative, impulsive, and less capable of experiencing guilt and remorse (e.g., Cooke, Forth, & Hare, 1998; Patrick, 2006; Salekin & Lynam, 2010). Although psychopathy cannot be diagnosed prior to the age of 18, the extant literature suggests that features of adult psychopathy can be extended downward to youth (Forth, Kosson, & Hare, 2003). These features are important predictors of future antisocial behaviour and violent offending (Gretton, Hare & Catchpole, 2004; Salekin, 2008).

In addition, studies have suggested that youth with psychopathic traits are more likely to join a gang (e.g., Dupere et al., 2007; Valdez, Kaplan, & Codina, 2000), become gang leaders or a core members (Yablonsky, 1962), and spend a longer period of time in a gang (Egan & Beadman, 2011). Empirical investigations of psychopathy and protective factors indicate mixed support for the utility of protective factors in these individuals. Some studies have found that the presence of certain protective factors in psychopathic individuals could heighten the probability of worse outcomes in the future. For example, high IQ, which is normally a protective factor for violence and antisocial behaviour in non-psychopathic individuals, has been found to moderate the relationship between psychopathic traits and offending, such that youth with higher IQs and higher levels of psychopathy were the most frequent offenders (Hampton, Drabick, & Steinberg, 2014). Other studies however have found no influence of protective factors on the offending of psychopathic individuals (DeMatteo et al., 2005). Yet, other studies have found that some protective factors may reduce serious and violent offending in psychopathic individuals (Salekin et al., 2010). Whether some protective factors increase, decrease, or have no effect on gang involvement in youth with psychopathic personality traits has yet to be examined.

In general, few studies have been conducted to examine factors that may protect against gang involvement. Although numerous possible protective factors have been suggested, the literature is far from reaching a consensus on evidence-based protective factors (Howell & Egley, 2005). Findings from the literature on youth gang involvement indicate that risk factors do not uniquely predict the probability of gang membership, but also other antisocial behaviours, conversely protective factors against delinquency and youth violence may also protect against gang involvement. This is a plausible assumption and has important implications for research on protective factors. Examining whether there is an overlap between protective factors against youth violence and youth gang membership helps provide an evidence-based approach to the study of protective factors against youth gang membership. Listed below are potential protective factors against youth gang membership. These were drawn from empirical studies that identified protective factors that had direct or indirect (e.g., buffering) effects against youth violence. In addition, when available, factors that were also suggested, albeit only conceptually, to protect against youth gang involvement are also presented. In the current research whether any of the factors identified below could directly, indirectly, or both indirectly and directly influence (i.e., increase or decrease) gang membership was examined.

### **Individual Protective Factors**

Individual level factors such as above average or high intelligence, an “easy-going” or “resilient” temperament, consisting of traits such as good social and coping skills, a sense of self-efficacy, and positive values and attitudes have been found to have both direct and indirect effects on protecting against youth violence (e.g., Farrington, 1994; Losel & Bliesener, 1994; Werner & Smith, 1992). Youth coping and social skills have also been suggested to have protective effects against youth gang involvement (Katz & Fox, 2010; McDaniel, 2012).

### **Peer Protective Factors**

Having a non-delinquent friend or being a member of a prosocial peer group (i.e., a group which disapproves of antisocial behaviour) has a direct protective effect against youth violence (Hawkins et al., 1998; Loeber et al., 2008). Close relationships with non-deviant peers or involvement in prosocial activities (e.g., religious groups) can also

buffer the effects of risk factors on violence (Herrenkohl et al., 2005; Werner & Smith, 2001). Interacting with prosocial peers has also been suggested to protect against youth gang joining (Katz & Fox, 2010).

### **Family Protective Factors**

An emotionally positive parent-child relationship (e.g., warm, accepting, supportive) and secure bonding has both direct and buffering effects on youth violence (Stouthamer-Loeber et al., 1993; Werner & Smith, 2001). In addition, intensive supervision and monitoring has mainly direct protective factors (Loeber, Farrington, Stouthamer-Loeber, & Kammen, 2008) but can also buffer the effects of risk factors on youth violence (Werner & Smith, 2001). Increased parental monitoring and strong parental involvement has also been suggested to decrease the likelihood of youth gang involvement (Li et al., 2002; Maxson et al., 1998).

### **School Protective Factors**

School achievement, strong school commitment, and bonding to school have been found to have both direct protective and buffering effects against youth violence (Farrington, 1994; Loeber et al., 2008; Werner & Smith, 2001). In addition, parents who take an interest in their child's education and who show positive attitudes towards strong school performance also have a direct protective effect against antisocial behaviour and violence (Farrington, 1994; Loeber et al., 2008). Commitment to school, as well as parents' expectations of strong school performance, have also been suggested to have protective effects on youth gang involvement (Stoiber & Good, 1998).

### **Community Protective Factors**

Living in a good neighbourhood (e.g., low crime rate, high socioeconomic status) has been found to have direct protective effects against youth violence (Loeber et al., 2008). In addition, residing in a good neighbourhood may buffer the impact of personal characteristics, such as impulsivity, on violence and aggressive behaviour (Kupersmidt, 1995). Consistent with social disorganization theory and the relationship between social cohesion and prevention of crime generally and violence specifically, studies have found that social cohesion among neighbourhoods can buffer the effects of residing in a

disadvantaged neighbourhood on youth involvement in violence (Sampson & Wikstrom, 2008; Seidman et al., 1998).

## **Cumulative Effects of Multiple Risk and Multiple Protective Factors on Gang Involvement and Offending**

It is well known that exposure to multiple risk factors increases the likelihood of gang involvement beyond that of an isolated risk factor (e.g., Esbensen et al., 2009; Hill et al., 2001; Howell & Egley, 2005). For example, in the Seattle Social Development Project, Hill et al. (1999) found that participants at ages 10 to 12 with seven or more risk factors from individual, peer, family, school, and community domains were 13 times more likely to join a gang between ages 13 and 18 compared to youth with only one or no risk factors present. Similarly, there is also evidence that the accumulation of protective factors has an additive inverse effect on gang involvement. McDaniel (2012) found that once youth acquired five or more protective factors (i.e., coping skills, peer support, positive parental reinforcement, parental monitoring, and family support), the odds of being gang affiliated was significantly lowered by 47% relative to youth with only one or no protective factors present.

What is less clear is whether an accumulation of protective factors can mitigate the effects of multiple risk factors. McDaniel (2012) did not find buffering effects of cumulative protective factors on the relationship between cumulative risk factors and gang involvement; however, only a small subset of potential protective factors from individual, peer, and family domains were included in the study. Thus, what remains unclear is the degree to which having an accumulation of protective factors across all five domains may reduce the likelihood of gang involvement or mitigate the effects of multiple risk factors. Given that the broader juvenile delinquency literature generally supports that finding that an accumulation of protective factors buffers the effect of cumulative risk on substance use (Epstein, Botvin, Griffin & Diaz, 2001), problem behaviour (Costa et al., 2005), and violence (Losel & Farrington, 2012), further research on the interaction between cumulative risk and cumulative protective factors is warranted.

Another issue is whether the extent of involvement in criminal activity within the gang is a by-product of accumulated risks and (an absence of) accumulated protective factors in a youth or by virtue of gang membership. In other words, are selection processes, facilitation processes, or both (Thornberry et al., 1993), operating? The reduction of offending by gang members is also important, and understanding whether risk and protective factors versus gang involvement influence offending will help aid intervention programs. A large number of studies have demonstrated that gang members are responsible for an inordinate amount of criminal activity in their communities (e.g., Decker, 1996; Klein & Maxson, 1989; Thornberry & Burch, 1997) and that adolescents who are members of a gang are more involved in antisocial behaviour than their non-member peers (Wortley & Tanner, 2005; see Spergel, 1990 for an review). However, it is unclear whether gang members exhibit offending risks beyond what is warranted by their level of risk and absence of protective factors. Some studies have found that leaving or joining a gang does not cause changes in antisocial behaviour (Esbensen & Huizinga, 1993; Hill et al., 1999), suggesting that individual-level risk factors (e.g., pro-criminal attitudes, impulsivity, substance use) may be more strongly involved in gang-related offending than gang involvement status itself. Other studies; however, have reported that gang membership is predictive of criminal activity above and beyond risk factors associated with individual participants (Gatti et al., 2005). This is again consistent with Thornberry et al.'s (1993) description of interactional theory. Gang involvement itself will facilitate offending at a rate higher than an offender with similar risk factors but who is not gang-involved. Past research examining the influence of gang status and risk factors on offending, however, is limited due to its tendency to control for only risk factors in individual (e.g., prior delinquency) and peer domains (e.g., affiliation with a delinquent peer group). Further, given (a) gang members' disproportionate involvement in violent offending specifically (Criminal Intelligence Service Canada, 2006; Federation of Canadian Municipalities, 1994), and (b) the possibility of overlap between protective factors against gang involvement, violence, and general offending, higher levels of offending may also reflect a lack of protective factors in gang-involved youth. However, no studies have examined whether gang involvement is associated with a higher frequency of offending after simultaneously controlling for risk and protective factors associated with gang involvement.

## **Measurement of Risk and Protective Factors Associated with Gang Involvement**

Although the notion of increasing structure to improve decision-making is not new (Monahan & Steadman, 1996), to date no instrument has been empirically validated that specifically measures the broad array of risk factors associated with youth gang involvement. Part of the neglect for a specific instrument may be due to the overlap between gang involvement and risk for general offending and violent offending. However, in the absence of a specific instrument, studies comparing risk for gang involvement and general offending have used numerous measures to tap empirically associated risk factors, potentially leading to inconsistent operational definitions of individual risk factors across studies and, as illustrated above, the exclusion of potentially important variables or sets of variables. Although one instrument, the Gang Risk Assessment Instrument (GRAI; Astwood Strategy Corporation, 2012), was developed in Canada to screen for youth gang involvement by examining risk factors in individual, peer, school, family, and community domains, there appears to be no published research on its use. Further, the GRAI omits several important risk factors for youth gang involvement (e.g., low parental monitoring, academic failure, prior delinquency). In order to properly assess risk factors associated with youth gang involvement, a comprehensive and well-validated measure that includes at least important predictors of gang involvement should be utilized.

Given the overlap between risk factors for violence and risk factors for gang involvement, structured violence risk assessment tools may have utility in identifying risk factors associated with gang involvement. The development of violence risk instruments has proliferated greatly over the past few decades (see Hart & Logan, 2011 for a review) and evidence suggests that such instruments outperform unstructured judgment concerning the risk of antisocial and violent behaviour (e.g., Douglas, Cox & Webster, 1999; Grove & Meehl, 1996). One violence risk assessment tool, the Structured Assessment of Violence Risk in Youth (SAVRY; Borum, Bartel, & Forth, 2006), was developed based on Bronfenbrenner's social ecological framework, and includes 24 risk factors in individual (e.g., a history of violent offending), peer (e.g., peer delinquency), family (e.g., poor parental management), school (e.g., poor school achievement), and community domains (e.g., community disorganization). In addition, the SAVRY includes

six protective factors, such as strong attachment and bonds, strong school commitment, and prosocial involvement. Given that protective factors against violent behaviour may also protect against youth gang involvement, protective items included on violent risk assessment tools may be a good starting point for systematically examining factors that may reduce the risk of gang involvement in youth. However, relative to risk factors, focus on protective factors within the SAVRY is limited. For example, when coding the SAVRY, all 24 risk items are described with detailed coding guidelines and are rated on a 3-point scale, whereas the six protective factors have vague instruction, are coded as present or absent, and only represent a subset of the known protective factors against youth violence (Brodersen, 2013). As such, additional measures of protective factors need to be used in conjunction with the SAVRY to provide a more balanced assessment of protective factors in youth. Nevertheless, the SAVRY might be helpful in identifying at least the risk factors associated with youth gang involvement. In a study of youth offenders on probation in Singapore, Chu and colleagues (2012) found that gang youth scored significantly higher than non-gang youth on the total risk scores and several individual items of the SAVRY.

In response to assessment tools that focus predominantly on risk factors, several tools have been developed to focus solely on protective factors that inhibit negative outcomes and enhance and promote positive development. One tool, the Developmental Assets Profile (DAP; Search Institute, 2004), is based on the youth positive development model and includes eight categories of internal (e.g., personal commitments, values and competencies) and external assets (e.g., support, empowerment, boundaries and expectations, constructive use of time) in individual, peer, family, school, and community domains. Although this instrument was constructed for the purposes of measuring positive health outcomes among adolescents (e.g., good psychological health, academic success, reduction in risk behaviours, Benson et al., 2004; Leffert et al., 1998), there is substantial overlap between some of the included asset categories and factors that have been identified in the broader juvenile delinquency literature to protect against violence and delinquency (e.g., positive values, commitment to learning). In addition, increases in scores on individual and ecological assets of the DAP have been found to be associated with positive developmental change among gang youth (Taylor et al., 2002). Thus, there is reason to believe the DAP will be helpful in identifying protective factors against youth gang involvement.

## **Rationale and Novel Contributions of the Current Research**

Suppression-based policies targeted at at-risk and gang-involved youth are unlikely to make a significant difference in preventing youth gang involvement and gang-related violence. There has been increasing attention to developing prevention and intervention programs targeted to youth gangs, however effective prevention and intervention measures require comprehensive knowledge of risk factors for and protective factors against youth gang membership. Although the research reviewed in previous sections has greatly enhanced our understanding of the factors that influence youth gang involvement and gang-related offending, this research has been limited in several key ways. As discussed in Chapters 2 and 3, few studies of risk and protective factors for youth gang involvement have been conducted in Canada, and much of what is known about youth gangs has been derived from the United States, a country with structural characteristics that are different from characteristics in Canada. Traditional theoretical explanations of youth gangs have also been constructed based on data from the United States, which may have limited application to youth gangs in Canada. In general, theoretical formulations of youth gangs have been limited due to their tendency to (1) focus on a single level of risk factors (e.g., micro- or macro-level factors) rather than the full spectrum of risk factors found to be related to youth gang involvement, (2) under-explore important psychological factors related to gang involvement, and (3) ignore factors that may protect youth from gang joining. Moreover, as discussed in the current chapter, the literature on protective factors for youth gang involvement is also limited due to a failure to address important conceptual issues regarding what a protective factor is, including whether protective factors are factors that have direct, indirect, or both indirect effects on gang involvement or if some protective factors may result in better or worse outcomes with respect to gang involvement for certain sub-groups.

Recognizing the abovementioned limitations, the current work presents five novel contributions to the study of youth gangs. First, to the best of the author's knowledge, this work is one of the first in Canada to examine a broad array of risk factors for and potential protective factors against youth gang involvement within a multi-domain, multi-disciplinary, and protective factor/strength-based framework. The use of this approach may reveal additional factors that have risk or protective effects on youth gang

membership. Second, this study builds on previous work by examining whether known protective factors for youth violence may also protect against youth gangs. Given that prior research has been restricted due to absence of a structured tool to guide decision making regarding the presence or absence of risk and protective factors for gang involvement, the current work uses a structured violence risk assessment tool to structure decision making regarding the presence of risk and protective factors in youth. Third, this study examines different conceptualizations of protective factors by analyzing whether protective factors for gang involvement have both direct and indirect effects within the same sample. Thus, this study is an important first step in clarifying definitional issues regarding protective factors for gang joining. Fourth, this study is one of the first to examine whether psychopathy interacts with protective factors to result in better or worse outcomes with respect to gang involvement. Fifth, this study builds on previous work by examining whether an accumulation of protective factors across multiple domains of functioning (i.e., individual, peer, family, school, community) can mitigate the effects of multiple risk factors on gang involvement and whether the relationship between gang involvement and offending remains significant when the effects of multiple protective factors are considered. Findings of the current work may assist in the development of evidence-based policy aimed at preventing the development of youth gangs and adapting appropriate gang-intervention strategies.

## Chapter 5. Current Study

Understanding youth gang involvement in Canada remains complex due to the multitude of risk factors that require consideration, as well as the lack of understanding and empirical guidance regarding protective factors. This complexity is perhaps best addressed through a similarly complex model that incorporates multi-level, multi-disciplinary frameworks. Using data collected from a sample of non-gang and gang-involved adolescent offenders, the current research integrated the social ecological and youth positive development models to examine risk and protective factors in individual, peer, family, school, and community domains associated with youth gang involvement. Past research has compared gang youth to non-offending youth in the general population (e.g., Esbensen 2000; Esbensen & Huizinga, 1993; Hill et al., 1999; Klein & Maxson, 2006), however in order to properly investigate indirect effects of protective factors on gang involvement, non-gang and gang-involved youth should have similarities in degree of risk and background characteristics (Losel & Farrington, 2012). Further, given the high involvement of gang members in crime and offending the use of a non-offending comparison group does not shed light on whether the risk factors characteristic of gang members increase risk of offending in general, or gang involvement, in particular. Thus, in the current study an offender comparison group was selected.

Given the lack of structured tools for examining the multitude of risk factors for youth gang involvement and the overlap between risk factors for gang involvement and violence, it was assumed that (a) the SAVRY would have utility in identifying risk factors associated with youth gang membership and (b) that there might also be overlap in the protective factors against violence and gang involvement. Because only a small subset of known protective factors against youth violence are included on the SAVRY, the DAP was included to further explore the utility of protective factors in examining gang involvement from a strength-based framework. Additional protective factors against youth violence not included on the SAVRY or the DAP (e.g., high socioeconomic status) were also measured. In the current study, five research questions were addressed:

1. Do non-gang and gang-involved youth offenders differ in risk and protective factors on the SAVRY, DAP, and other measures of protective factors included in the study? It was hypothesized that non-gang and gang-involved youth offenders would score differently on measures of risk and protective factors. Specifically, gang-involved youth were expected to score higher on measures of risk and lower on measures of protection.
2. Is there a cumulative effect of multiple risk factors and multiple protective factors on gang involvement? A large body of literature indicates that experiencing multiple risk factors is associated with a greater likelihood of gang involvement (Esbensen, Peterson, Taylor & Feng, 2009; Thornberry et al., 2001). In addition, there is some evidence to suggest that the presence of multiple protective factors reduces the likelihood of gang involvement (McDaniel, 2012). As such, it was expected that an accumulation of risk factors would be associated with a greater likelihood of gang involvement, whereas an accumulation of protective factors would be associated with reductions in the likelihood of gang involvement.
3. What is the effect of gang involvement on the time and frequency of offending, controlling for the effects of the risk and protective factors associated with gang membership? In the current study, the relationship between gang status and offending was prospectively examined at three different time points (3 months, 12 months, and an average of 4 years after the baseline assessment), controlling for level of risk and protective factors found to be associated with gang membership in the previous analysis. These different time points were selected to examine the influence of gang involvement on offending in the short-, medium-, and long-term. To the best of the author's knowledge, no studies to date have examined the relationship between gang status and offending while controlling for the effects of protective factors. Given the overlap between risk factors and potentially protective factors for and against gang involvement, violence, and offending, it was expected that gang-status would not be significantly associated with the imminence or rate of violent, non-violent, and general offending in the short-, medium- and long-term once the effects of risk and protective factors associated with gang involvement were controlled for.
4. Do protective factors moderate or mediate the relationship between risk factors and gang involvement? Youth exposed to multiple risk factors often do not engage in violence or antisocial outcomes, suggesting that there may be factors that moderate the effects of risk (Loeber & Farrington, 2012). In addition, the absence of protective factors may partially or fully account for the relationship between risk factors and gang involvement. It was expected that in addition to exhibiting a direct inverse relationship with gang involvement, at least some of the protective factors included in the current research will exert indirect effects on the relationship between risk factors and gang membership.
5. Do protective factors moderate or mediate the relationship between psychopathy and gang involvement? Although no research on psychopathy, protective factors, and gang involvement exists to date, studies of psychopathic individuals have found that some protective factors can increase risk (Gummelt, 2010), decrease risk (Salekin et al., 2010) or have no effect (DeMatteo et al., 2005). Whether

certain protective factors actually increased risk for gang involvement for youth offenders scoring high on psychopathy was examined.

## **Chapter 6. Method**

### **Research Design and Procedure**

The current study is based on a subsample of adjudicated youth who were interviewed in the Lower Mainland of British Columbia as part of an ongoing study on Mental Health, Risks, and Strengths (MHRS) directed by Dr. Jodi Viljoen and Dr. Kevin Douglas. The MHRS project was initiated in 2008 and is funded by the Social Sciences and Humanities Research Council of Canada. The main purpose of the MHRS study is to identify risk and protective factors for and against reoffending among adolescent offenders. Participants were recruited from probation offices and custody centers if they were capable of informed consent and met the following criteria: (a) between the ages of 12 and 18, (b) adjudicated in the youth criminal justice system, (c) under active community supervision, and (d) able to speak English fluently. Youth could participate in the study if their parents/guardians provided consent, and the youth provided assent. Once permission to participate had been received, an appointment was made with the youth to complete an initial assessment comprised of a semi-structured interview and self-report questionnaires designed to evaluate the youth's risks, strengths, and activities. In addition, file information was collected and, in conjunction with information gathered during the interview, was used to complete additional risk assessment measures following each session. Following the initial assessment, participants were re-assessed at 3, 6, 9, and 12 months thereafter. Official recidivism data was also recorded from the youth's file up to an average of 4 years after the baseline assessment ( $SD = 1.02$  years, range 2 years to 5.58 years).

In order to examine the effects of gang status on offending, self-report and official data were prospectively examined over 3 months (short-term), 12 months (medium-term), and up to an average of 4 years (long-term) from the start of the MHRS study. Youth were already gang or non-gang involved at the start of the study and therefore it was not possible to collect information on risk and protective factors prior to

study participants joining a gang. As such, risk and protective factors were concurrently examined using baseline data. One major limitation of this approach is that the temporal relationship between risk factors, protective factors, and gang involvement cannot be determined. For example, whether gang members had higher rates of substance use problems than non-gang members cannot be determined from the data as it is unknown if these problems are a risk factor for joining a gang or a consequence of being in a gang (e.g., Krohn & Thornberry, 2008). The same is true of protective factors. Although it is unlikely gang membership would result in an increase of protective factors, it is also possible that, for example, joining a gang gives adolescents perceptions of increased attachments to 'family' (e.g., adult gang leaders or core members) or self-efficacy (e.g., sense of purpose in life).

## **Measurement and Definition of Gang Involvement**

In this study, either a youth self-report or a youth justice file report of gang involvement was sufficient for youth to be considered gang-involved. Youth responded to two questions "Have you ever been in a gang?" and "Are you currently in a gang?" Youth justice files were also used to code "yes (2)", "possibly (1)", or "no (0)", in respect to gang membership for the youth. Youth who self-reported or were identified under the "yes" category from youth justice files were classified as gang members. Former gang members (i.e., youth that had been involved with gangs in the past) and current gang members (i.e., youth with a continued involvement in gangs) were collapsed into one category in line with prior studies indicating that past gang membership for adolescent offenders still indicates a recent gang affiliation (Decker & Kempf-Leonard, 1991; Deschenes & Esbensen, 1999, p. 63; Esbensen, Deschenes, & Winfree, p. 37; Esbensen & Winfree, 1998, p. 516) and that past gang members are more behaviourally similar to current gang members than to non-gang members (Spergel, 1990). If youth self-reported gang involvement, they also completed the Office of Juvenile Justice and Delinquency Prevention (OJJDP) Comprehensive Model Survey (Office of Juvenile Justice and Delinquency Prevention, 2002) which asked them a series of questions concerning the characteristics of their gang/group including its size, whether it had a name, regular meeting, special clothing, and their embeddedness within the gang's core or the inner-most members (i.e., gang centrality). This measure, however, was

introduced halfway through the study period, therefore, was only completed by a subset of gang youth.

## Sample

In total, 163 adolescents aged 12 to 18 participated in the MHRS study; however, only four females met the criteria for gang affiliation and therefore all females were excluded from the current study. Of the 112 male youth, 30.35 % ( $n = 34$ ) of youth were identified as gang-involved through either self-report or official records (see Table 2). Official records indicated either possible or certain gang involvement for 88% ( $n = 17$ ) of youth who self-reported gang involvement. Of the 81 youth who reported no gang involvement, three were identified by official records as having gang involvement and were subsequently included in the gang-involved category. Overall, there was reasonable agreement between youth self-reports of gang involvement and official records (intraclass correlation coefficient [ICC], two-way random effects model = .50) but by measuring gang-involvement through multiple sources also provided some unique information. Information regarding gang characteristics was only available for about half (47.0%,  $n = 16$ ) of identified gang members. Of the gang youth with available data, 18.75% ( $n = 3$ ) reported that they were a gang leader, 31.25% ( $n = 5$ ) a core or influential member (i.e., with their gang all of the time), 18.75% ( $n = 3$ ) a regular member (i.e., involved with their gang most of the time), 12.5% ( $n = 2$ ) a peripheral member (i.e., minimally involved with their gang), and 18.75% ( $n = 3$ ) did not know their position in their gang. Almost a third of these youth (31.25%,  $n = 5$ ) had joined their gang before the age of 13. More than half (56.25%,  $n = 10$ ) reported that their gang had initiation rites and that their gang had colors or symbols (81.25%,  $n = 14$ ). All of the youth that completed the ODDJP Comprehensive Model Survey reported that their gang was involved in some form of delinquent activity (e.g., fights with other gangs, stole cars, sold drugs).

**Table 2. Proportion of Non-Gang and Gang-Involved Youth Offenders in the Study**

	<i>n (%)</i>
<b>Gang Involvement</b>	
No gang involvement	78 (69.64)
Gang involvement	34 (30.36)
<b>Type of Report (<i>n</i> = 34)</b>	
Self-report and official records	17 (50.00)
Self-report only	14 (41.18)
Official records only	3 (8.82)
<b>When Gang-Involved (<i>n</i> = 34)</b>	
Past and current	7 (20.58)
Past only	24 (70.58)
Current only	3 (8.82)

## **Demographic and Offending Characteristics of Non-Gang and Gang-Involved Youth Offenders**

Whether gang and non-gang youth offenders significantly differed on demographic or offending characteristics was examined using independent samples *t*-tests and chi-square analysis (see Table 3). Compared to non-gang youth, gang youth were slightly but significantly older, had a higher number of arrests, and an earlier age of first physical fight. Groups did not differ based on ethnicity, index offences, or whether the youth had been in foster care. In addition, there were no significant differences between gang and non-gang involved youth based on current grade, age of first arrest, or age of first physical fight. Comparisons were also made between youth who self-reported gang membership versus youth who were identified as gang-involved by official records, and youth who were current versus past gang members. As only three youth were identified as gang-involved by official records only, and only one youth reported current but not past gang involvement, these individuals were excluded from the analyses. Demographic and offending characteristics did not significantly differ as a function of when the youth was gang-involved (past versus both current and past), or how gang involvement was identified (self-report only versus self-report and official records; see Tables 4 and 5). However, due to the small number of participants in these

groups statistical comparisons were likely underpowered. Significant differences might emerge with a larger sample size.

**Table 3. Demographic and Offending Characteristics of Total Sample, Non-Gang, and Gang Involved Youth Offenders**

	Total ( <i>n</i> = 112)	Non-Gang Youth ( <i>n</i> = 78)	Gang Youth ( <i>n</i> = 34)	<i>t</i> / $\chi^2$ (df), <i>p</i> , Cohen's <i>d</i> / $\phi$
<b>Demographic Characteristics</b>				
Age	16.01 (1.11)	15.86 (1.19)	16.35 (0.81)	<i>t</i> (110) = -2.20, <i>p</i> = .03, <i>d</i> = 0.48
Current Grade	10.26 (1.08)	10.23 (1.12)	10.31 (1.01)	<i>t</i> (83) = -0.32, <i>p</i> = .75, <i>d</i> = 0.08
Ethnicity				$\chi^2$ (6) = 6.54, <i>p</i> = .27, $\phi$ = 0.24
Caucasian	54 (48.20%)	36 (46.15%)	18 (52.94%)	--
Aboriginal	21 (18.85%)	11 (14.10%)	10 (29.41%)	--
Other	37 (33.03%)	20 (25.64%)	10 (29.41%)	--
Foster Care	47 (42.00%)	31 (39.74%)	16 (47.06%)	$\chi^2$ (1) = 0.52, <i>p</i> = .47, $\phi$ = 0.47
<b>Offence Characteristics</b>				
Index Offence <sup>†</sup>				
Violent Offence	67 (59.80%)	50 (64.10%)	17 (50.00%)	$\chi^2$ (1) = 3.25, <i>p</i> = .09, $\phi$ = 0.17
Non-Violent Offence	65 (58.04%)	41 (52.56%)	24 (70.59%)	$\chi^2$ (1) = 3.16, <i>p</i> = .09, $\phi$ = 0.17
Age of first arrest	13.96 (1.71)	14.10 (1.55)	13.60 (2.01)	<i>t</i> (110) = 1.27, <i>p</i> = .16, <i>d</i> = 0.28
Age of first physical fight	10.14 (3.28)	10.82 (3.19)	8.54 (2.99)	<i>t</i> (101) = 3.39, <i>p</i> = .001, <i>d</i> = 0.74
Number of times arrested	16.90 (29.22)	8.71 (12.36)	35.67 (46.64)	<i>t</i> (110) = -2.20, <i>p</i> = .002, <i>d</i> = 0.74

Note. Mean (Standard Deviation) / *n* (%). df = Degrees of Freedom.

<sup>†</sup> Index offences not mutually exclusive, youth could be charged with multiple offences.

**Table 4. Demographic and Offending Characteristics of Former and Current Gang Involved Youth Offenders**

	Past Gang Involvement ( <i>n</i> = 24)	Both Current and Past Gang Involvement ( <i>n</i> = 34)	<i>t</i> / $\chi^2$ (df), <i>p</i> , Cohen's <i>d</i> / $\phi$
<b>Demographic Characteristics</b>			
Age	16.38 (0.64)	16.14 (1.35)	<i>t</i> (26.83) = 0.44, <i>p</i> = .67, <i>d</i> = 0.23
Current Grade	10.31 (0.88)	10.25 (1.54)	<i>t</i> (26.08) = 0.10, <i>p</i> = .94, <i>d</i> = 0.05
Ethnicity			$\chi^2(6)$ = 0.39, <i>p</i> = .46, $\phi$ = 0.11
Caucasian	12 (50.00%)	4 (57.14%)	--
Aboriginal	8 (33.30%)	2 (28.57%)	--
Other	4 (16.67%)	1 (12.28%)	--
Foster Care	12 (50.00%)	2 (28.57%)	$\chi^2(1)$ = 0.18, <i>p</i> = .32, $\phi$ = 0.07
<b>Offence Characteristics</b>			
Index Offence †			
Violent Offence	12 (50.00%)	4 (57.14%)	$\chi^2(1)$ = 0.11, <i>p</i> = .74, $\phi$ = 0.11
Non-Violent Offence	18 (75.00%)	4 (57.14%)	$\chi^2(1)$ = 0.84, <i>p</i> = .36, $\phi$ = 0.16
Age of first arrest	12.35 (2.43)	10.71 (3.03)	<i>t</i> (29) = 1.49, <i>p</i> = .44, <i>d</i> = 0.59
Age of first physical fight	8.08 (2.87)	9.83 (3.43)	<i>t</i> (27) = -1.28, <i>p</i> = .21, <i>d</i> = 0.55
Number of times arrested	36.50 (50.55)	33.42 (33.33)	<i>t</i> (29) = 0.15, <i>p</i> = .88, <i>d</i> = 0.07

Note. Mean (Standard Deviation) / *n* (%). df = Degrees of Freedom.

† Index offences not mutually exclusive, youth could be charged with multiple offences.

**Table 5. Demographic and Offending Characteristics of Gang Involved Youth Offenders as a Function of Reporting Type**

	Self-Report ( <i>n</i> = 13)	Both Self-Report and Official Records ( <i>n</i> = 18)	<i>t</i> / $\chi^2$ (df), <i>p</i> , Cohen's <i>d</i> / $\phi$
<b>Demographic Characteristics</b>			
Age	16.23 (0.73)	16.39 (0.92)	<i>t</i> (29) = -0.52, <i>p</i> = .61, <i>d</i> = 0.19
Current Grade	10.11 (0.78)	10.40 (1.17)	<i>t</i> (23) = -0.67, <i>p</i> = .51, <i>d</i> = 0.29
Ethnicity			$\chi^2$ (6) = 0.35, <i>p</i> = .62, $\phi$ = 0.10
Caucasian	7 (53.84%)	9 (50.00%)	-
Aboriginal	4 (30.77%)	6 (33.30%)	-
Other	2 (15.38%)	3 (5.56%)	-
Foster Care	7 (53.84%)	7 (38.80%)	$\chi^2$ (1) = 0.19, <i>p</i> = .55, $\phi$ = 0.07
<b>Offence Characteristics</b>			
Index Offence <sup>†</sup>			
Violent Offence	5 (38.46%)	11 (61.11%)	$\chi^2$ (1) = 1.92, <i>p</i> = .38, $\phi$ = 0.24
Non-Violent Offence	9 (69.23%)	13 (72.22%)	$\chi^2$ (1) = 0.24, <i>p</i> = .97, $\phi$ = 0.08
Age of first arrest	11.65 (3.63)	12.22 (1.62)	<i>t</i> (15.46) = -0.53, <i>p</i> = .17, <i>d</i> = 0.20
Age of first physical fight	8.29 (2.05)	8.55 (3.64)	<i>t</i> (27) = -0.23, <i>p</i> = .81, <i>d</i> = 0.08
Number of times arrested	31.0 (37.93)	39.27 (52.98)	<i>t</i> (29) = -0.48, <i>p</i> = .32, <i>d</i> = 0.18

Note. Mean (Standard Deviation) / *n* (%). df = Degrees of Freedom.

<sup>†</sup> Index offences not mutually exclusive, youth could be charged with multiple offences.

## Measures

An overview of the risk and protective factors included in the current study is provided in Tables 6 and 7.

### Structured Assessment of Violence Risk in Youth

The Structured Assessment of Violence Risk in Youth (SAVRY; Borum et al., 2006) is a violence risk assessment tool that is completed by trained raters using available data obtained from a semi-structured interview, file review, and self-report questionnaires. It is comprised of 24 items that assess risk factors from static-historical (10 items), social-contextual (6 items), and individual domains (8 items). Risk factors are coded as being “low” when the factor is absent, “moderate” when the factor is somewhat present, or “high” if the factor is obvious and persistent. In addition, six domains of protective factors are assessed, which are dichotomously rated as “absent” or “present.” The final risk estimate, which is determined based on the totality of the youth’s risk and protective factor profile, is communicated in terms of a SAVRY summary risk rating (i.e., low, moderate, or high risk for violence). Although the SAVRY authors underscore the importance of a structured professional judgment approach to the final risk estimate (i.e., gathering, weighting, and combining the evidence according to the evaluator’s judgement), for research purposes, risk item scores can be converted into numerical values ranging from “low” (0) to “high” (2) and totalled to create a total risk score ranging from 0 to 48, with higher scores indicating the presence of a greater number of risk. Similarly, protective items can be converted into numerical values (0 = “absent”, 1 = “present”) and totalled, with a higher score indicating the presence of a greater number of protective factors present in the youth. Research has indicated the SAVRY has good internal consistency ( $\alpha = .82$ ) and inter-rater reliability (ICC = .81; Borum, et al., 2006), and significantly predicts subsequent violent charges (Borum et al., 2005; Catchpole & Gretton, 2003), with predictive power at least equal to other violence risk assessment tools (Olver, Stockdale, & Wormith, 2009; Singh, Grann & Fazel, 2011). In addition, the likelihood of future violent behaviour decreases with associated increases in the number of protective items from the SAVRY scale (Hawkins et al., 1998; Herrenkohl et al., 2000; Lipsey & Derzon, 1998). In the current study, excellent internal

consistency was obtained for SAVRY Total Risk Score ( $\alpha = .83$ ) and adequate internal consistency was obtained for the Historical ( $\alpha = .70$ ), Social-Contextual ( $\alpha = .72$ ), Individual ( $\alpha = .75$ ), and Protective ( $\alpha = .70$ ) subscales.<sup>1</sup> To address inter-rater reliability of the SAVRY 21 cases were randomly chosen for an inter-rater reliability check.<sup>2</sup> ICC values ranged from good to excellent for SAVRY risk total and subscale scores (ICC values were .89, .70, .71, and .89 for Total, Historical, Social-Contextual, and Individual scales, respectively).<sup>3</sup> Individual risk items on the SAVRY had fair to excellent Inter-rater reliabilities, ICC ranging from .45 (SC13: Poor Stress and Coping) to .91 (H1: History of Violence). Inter-rater reliability of individual SAVRY protective items had fair to almost perfect agreement [kappa values were .58, .38, .84, .43, .43 and .60 for (P1) Prosocial Involvement, (P2) Strong Social Support, (P3) Strong Attachment and Bonds, (P4) Positive Attitudes towards Intervention/Authority, (P5) Strong Commitment to School, and (P6) Resilient Personality, respectively].<sup>4</sup>

<sup>1</sup> Values of Cronbach's alpha greater than .90 are considered excellent, values between .80 and .89 are good, values between .70 and .79 are fair, and values less than .69 are poor (Nunnally & Bernstein, 1978).

<sup>2</sup> Twelve raters rated roughly one to five of the 21 cases, and each of 16 others rated roughly one to two cases.

<sup>3</sup> Values of ICC greater than .75 are considered excellent, values between .74 and .60 are considered good, values between .59 and .40 are fair (Cicchetti & Sparrow, 1981).

<sup>4</sup> Kappa values greater than .81 considered almost perfect agreement, values between .61 and .80 substantial agreement, .41 to .60 moderate agreement, and .21 to .40 fair agreement, and less than .20 poor agreement (Landis & Koch, 1977).

**Table 6. Risk Factors for Youth Gang Membership Measured in the Current Study**

<b>Domain</b>	<b>Factor(s)</b>	<b>Measure (s)</b>
<b>Individual</b>	Prior violence and aggression	(H1) History of Violence, (H3) Early Initiation of Violence
	Prior delinquency	(H2) History of Non-Violent Offending
	Mental health issues and problem behaviours	(H4) Past Supervision/Intervention Failures, (H5) History of Self-Harm/Suicide Attempts, (I4) Anger Management Problems, (I6) Attention Deficit/Hyperactivity (I7) Poor Compliance
	Deviant attitudes	(I17) Negative Attitudes
	Low levels of empathy and remorse	(I21) Low Empathy/Remorse
	Proclivity towards excitement	(I18) Risk Taking/Impulsivity
	Substance use/abuse	(I19) Substance Use Difficulties
<b>Peers</b>	Association with delinquent peers	(SC11) Peer Delinquency
	Lack of social support	(SC12) Peer Rejection, (SC15) Lack of Personal Support
<b>Family</b>	Family disorganization	(SC14) Poor Parental Management, (SC15) Lack of Personal Support
	Troubled family (e.g., family violence)	(H6) Exposure to Violence in the Home, (H7) Childhood History of Maltreatment, (H9) Early Caregiver Disruption
<b>School</b>	Lack of parental role models	(H8) Parental/Caregiver Criminality
	Academic failure, trouble at school	(H10) Poor School Achievement
	Low commitment to school, low educational aspirations	(I24) Low Interest and Commitment to School
<b>Community</b>	Social disorganization (e.g., poverty), lack of social and economic opportunities, neighbourhood crime	(SC16) Community Disorganization

**Table 7. Potential Protective Factors against Youth Gang Membership Measured in the Current Study**

<b>Domain</b>	<b>Factor(s)</b>	<b>Measure (s)</b>
<b>Individual</b>	Above average intelligence, resilient temperament, good social skills, positive coping skills	SAVRY (P6) Resilient Personality Traits, DAP Social Competencies Subscale
	Sense of self-efficacy	DAP Positive Identity Subscale
	Positive values and attitudes	SAVRY (P4) Positive Attitudes towards Intervention and Authority, DAP Positive Values Subscale
	Empowerment	DAP Empowerment Subscale
<b>Peers</b>	Interactions with prosocial peers, involvement in prosocial activities <sup>5</sup>	SAVRY (P1) Prosocial Involvement DAP Constructive Use of Time Subscale
<b>Family</b>	Connectedness to family	SAVRY (P3) Strong Attachment and Bonds, SSDP Attachment to Parents
	Parental monitoring	SSDP Parental Monitoring
	Support from parent or other adult	SAVRY (P2) Strong Social Support Presence of Caring—Individual Protective Factors Index
<b>School</b>	Perceived expectations about school	DAP Boundaries/Expectations Subscale (Items 50, 53, 57)
	Strong school commitment and motivation	SAVRY (P5) Commitment to School DAP Commitment to Learning Subscale
<b>Community</b>	Social cohesion/trust among neighbours	DAP Community Subscale (Items 41, 48, 55)
	High socioeconomic status	Hollingshead Index of Social Position

<sup>5</sup> Although self-report data on prosocial peer affiliation had been collected, this information was recorded halfway through the study period, therefore was only available for a subset of participants. As such involvement in prosocial activities was used as proxy for prosocial peer affiliation as it was likely that involvement in prosocial activities would increase interactions with prosocial youth.

## Developmental Assets Profile

The Developmental Assets Profile (DAP; Search Institute, 2004) is a 58-item youth self-report measure that examines internal and external resilience assets in across five domains of functioning (i.e., personal, social, family, school, community). Each question on the DAP is responded to on a four point Likert scale from “not at all” (0) to “almost always” (3) and is answered in reference to the previous three month period. For the current study, the following internal and external asset categories were investigated: Social Competencies (i.e., positive coping and social skills; 8 items, e.g., “I avoid things that are dangerous and unhealthy”, “I am sensitive to the needs and feelings of others”); Positive Identity (i.e., self-efficacy; 6 items, e.g., “I feel in control of my life and my future”, “I am developing a sense of purpose in my life”); Positive Values (11 items, “I stand up for what I believe in”, “I think it is important to help other people”); Empowerment (6 items; “I feel valued and appreciated by others”, “I am given useful roles and responsibilities”); Commitment to Learning (5 items; e.g., “I do my homework”, “I care about school”); and Constructive Use of Time (i.e., involvement in prosocial activities, 4 items, “I am involved in a religious group or other activity”, “I am involved in creative things such as music, theatre, or art”). The DAP has been shown to have good internal consistency (Cronbach’s alpha values ranging from .81-.97) and test-retest reliability ( $r$  ranging from .79-.87; Search Institute, 2004). Lower scores on the DAP have been found to be significantly associated with delinquency and violence (Leffert et al., 1998), whereas higher scores on the DAP have been found to be associated with positive outcomes and thriving (e.g., good psychological health, academic success, reduction in risk behaviours, Benson et al., 2004; Leffert et al., 1998). In the current study, good internal consistency was obtained for the Positive Identity ( $\alpha = .80$ ), Positive Values ( $\alpha = .82$ ), and Commitment to Learning ( $\alpha = .80$ ) subscales, whereas adequate internal consistency was obtained for the Social Competency ( $\alpha = .76$ ), Empowerment ( $\alpha = .70$ ), and Constructive Use of Time ( $\alpha = .70$ ) subscales.

Two additional indices were created using items from the DAP that measure school achievement expectations and neighbourhood social cohesion. An index for school achievement expectations was created by combining three conceptually-related items from the DAP Boundaries and Expectations subscale (“I have teachers who urge me to develop and achieve”, “I have parents to urge me to do well in school”, “I have school that enforces rules fairly”). These variables were subjected to a principal

components analysis (PCA), which indicated a single-factor solution that accounted for 58.23% of the variance in these variables, with an eigenvalue of 1.74. As a further test of the adequacy of combining these variables, a confirmatory factor analysis using MPlus 3.11 (Muthen & Muthen, 2004) with maximum likelihood estimation was conducted. This procedure revealed very good fit for the three-item, one-factor model (Comparative Fit Index [CFI] = .95; Standardized Root Mean Square Residual [SRMR] = .03). This final index was called "School Expectations". An index for social cohesion and trust among neighbours was created by combining three conceptually-related items from the DAP Community subscale ("I spend time serving others in the community", "I have good neighbours who care about me" and "I have neighbours who watch out for me"). Principal components analysis (PCA) indicated a single-factor solution that accounted for 62.77% of the variance in these variables, with an eigenvalue of 1.88. CFA revealed very good fit for the three-item, one-factor model (CFI = .98; SRMR = .02.). This final index was called "Neighbourhood Cohesion" Internal consistency for these two indices was acceptable ( $\alpha = .71$  and  $.72$  for School Expectations and Neighbourhood Cohesion, respectively).

### **Seattle Social Development's Project Parental Supervision and Attachment to Parents Scales**

Two scales developed using data from the Seattle Social Development Project (SSDP) were used to measure parental supervision and attachment to parents (Arthur et al., 2002). Both scales consist of self-report items that are rated on a four-point Likert scale from "very false" (0) to "very true" (3). The Parental Supervision scale consists of eight items that measure youths' beliefs about how closely their parents monitor their behaviours. Example items include "Parents know who I'm with" and "If I drank I would be caught by my parents." Studies have found that the Parental Supervision scale has good internal consistency ( $\alpha = .83$ , Arthur et al., 2002). The Attachment to Parents Scale is a four-item scale that measures youth's closeness to their parents (e.g., "I feel close to my mother/father" and "I share thoughts/feeling with mother/father"). A total is computed by summing across items, with higher scores indicating higher levels of connectedness of the youth to their families. This scale has demonstrated adequate internal consistency in past studies ( $\alpha = .76$ ; Arthur et al., 2002). In the current study, internal consistency was acceptable for Parental Supervision ( $\alpha = .78$ ) and Attachment to Parents ( $\alpha = .79$ ).

## **Presence of Caring – Individual Protective Factors Index**

The Presence of Caring - Individual Protective Factors Index (Presence of Caring - IPFI) is a subscale derived from the Individual Protective Factors Index (IPFI; Phillips & Springer, 1992), which was initially created as a tool for evaluating prevention programs for high-risk adolescents ranging from 10 to 16 years old. The Presence of Caring subscale consists of nine items that measure the extent to which a youth feels supported and cared for by an adult(s). Example items include “I have an adult I can depend on” and “I have an adult I can turn to for advice.” Respondents are asked to indicate how strongly they feel each sentence is true for them. A “YES!” (3) is checked if the statement is very true for them; “yes” (2) if it is somewhat true; “no” (1) if it is somewhat false; and “NO!” (0) if it is very false. Higher scores indicate higher levels of support experienced by the youth. The internal consistency of this subscale has been reported to be adequate ( $\alpha = .65$ ; Phillips & Springer, 1992). Test re-test reliability has not yet been reported. Research suggests that scores on IPFI and its subscales are associated with decreased involvement in negative behaviours, such as substance use (Sale, Sambrano, Springer, & Turner, 2003). In the current study, internal consistency was acceptable ( $\alpha = .79$ ).

## **Hollingshead’s Index of Social Position**

In the current study it was not possible to obtain direct measures of neighbourhood disadvantage (i.e., census data), therefore individual socioeconomic status (SES) was used as a proxy for neighborhood disadvantage given that individuals with low SES status are likely residing in more disadvantaged neighbourhoods. Socioeconomic status was determined using responses to the following questions: “What is your biological father/mother’s type of work” and “What amount of school has your biological mother/father finished.” Responses were coded using Hollingshead’s Index of Social Position (see Hollingshead, 1957). Parent’s education was ranked on a 7-point scale with higher scores indicating higher levels of education and parent’s occupation was ranked on a 9-point scale with higher scores indicating greater occupational prestige. Social Position was then computed using the following formula:  $((\text{Occupation score} \times 7) + (\text{Education score} \times 4))$  (see Hollingshead, 1971; 1975). When occupation and education for both parents was available, the average of each was used in the equation.

## Psychopathy Checklist: Youth Version

The Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) is a 20-item expert symptom-rating scale that measures psychopathic personality traits in youth. Ratings are completed by trained researchers based on a series of interviews as well as available file information. Each item is scored as either 0 (the item does not apply to the youth), 1 (the item applies to the youth to some extent), or 2 (the item definitely applies to the youth). Scoring is aided by a technical manual designed by Forth, Kosson, and Hare (2003). This manual provides a detailed descriptor for each item, including what factors to consider in scoring each of the items. A total score is generated from the sum of the 20 individual items, and can range from 0 to 40. Although there is no diagnostic score to categorize adolescents as psychopathic, scores of 25 or higher are generally used to indicate high levels of psychopathic traits in youth (Dyck, Campbell, Schmidt, & Wershler, 2013; Forth et al., 2003). Factor scores were also calculated according to Hare's 4-factor model that includes interpersonal (Factor 1; i.e., impression management, grandiose sense of self-worth, pathological lying, manipulation for personal gain), affective (Factor 2; i.e., lack of remorse, shallow affect, callous/lacking empathy, failure to accept responsibility), lifestyle (Factor 3; i.e., stimulation seeking, parasitic orientation, impulsivity, irresponsibility) and antisocial features (Factor 4; i.e., poor anger control, early behaviour problems, juvenile delinquency, revocation of conditional release and criminal versatility). Studies indicate that the PCL:YV is the most valid and reliable measure available for assessing symptoms of psychopathy in incarcerated adolescent males (Forth & Burke, 1998; Salekin et al., 2004). Further, the PCL:YV has been shown to predict violence and reoffending in a number of studies (Corrado, Vincent, Hart, & Cohen, 2004; Forth, 2005; Schmidt, McKinnon, Chatta, & Brownlee, 2006). The inter-rater reliability of the PCL:YV is generally high with a single-rater intraclass correlation coefficient ( $ICC_1$ ) of .82 ( $n = 10$ ; Spain, Douglas, Poythress & Epstein, 2004) to .89 ( $n = 30$ ; Salekin et al., 2004). The internal consistency of PCL:YV scores is acceptable, with alpha coefficients ranging from .85 to .94 (Forth et al; 2003; O'Neill et al., 2003). In the current study, internal consistency ranged from acceptable to good for the PCL:YV total and subscale scores ( $\alpha = .87, .71, .73, .72,$  and  $.70$  for PCL:YV Total, Factor 1, Factor 2, Factor 3, and Factor 4, respectively). An inter-rater reliability check was completed on 21 cases selected at random. In the current study, ICC values were excellent for the PCL:YV total and

subscale scores (ICC = .93, .88, .83, .87, .83 and .82 for PCL:YV Total, Factor 1, Factor 2, Factor 3, and Factor 4, respectively). Individual items on the PCL:YV had fair to good inter-rater reliability, with ICC values ranging from .41 (Item 7: Shallow Affect) to .74 (Item 5: Manipulation for personal gain).

## **Offending**

Offending was assessed using both official (collected at 3 months, 12 months, and an average of 4 years after the baseline assessment) and self-report data (collected at 3-month and 12-month follow-ups). Official information was collected from the Corrections Network (CORNET), an integrated system used for tracking all offenders in provincial institutions within British Columbia. Coders were blind to youth's gang status. Collected data included the number of total charges and convictions a youth incurred over the follow-up period, the specific charge/conviction, the type of charge/conviction, and total number of that type of charge/conviction. Charges/convictions were coded into count variables of violent, non-violent, or any recidivism. Violent offences included differing degrees of murder and assault, unlawful confinement, robbery and uttering threats. Non-violent offences included property offences (e.g., theft, possession of stolen property, vandalism and mischief), court violations (i.e., any failure to comply with a court ordered disposition such as conditions of a sentence or bail supervision), drug offences (e.g., possession and trafficking), and miscellaneous offences (e.g., possession of weapons and driving offences). Time-at-risk was calculated for both violent, non-violent, and any recidivism as the number of days between the date of baseline data collection and one of two subsequent dates: date of offence/conviction (violent, non-violent, or any) or end of the longest follow-up interval (i.e., 5.58 years or April 25, 2014).

Self-reported offending was assessed using the Self-Report of Offending (SRO; Huizinga, Esbensen, & Weiher, 1991). This 24-item tool examines involvement in criminal activities and can be broken down into subscales related to violent offences (10 items) and income-related (non-violent) offences (14 items; see Table 8). On the original scale respondents answer yes or no as to whether they have engaged in offending behaviour since the last follow-up interview, however for this study the response format was changed to a Likert scale querying the number of time the youth had engaged in each type of offence since the last follow-up assessment (i.e., 0 = Never, 1 = 1 time, 2 =

2 or more times). In addition, one item was removed due to ethical issues (i.e., whether the youth had killed someone). The resultant variable was a count of offending behaviour ranging from 0 to 23, with higher values indicating a greater degree of involvement in criminal activities. Responses on the SRO were used to group offences as violent, non-violent, or any. The SRO has been reported to have good reliability, with alpha coefficients of .88, .74 and .80 for total, violent and non-violent scores (Mulvey et al., 2004). In addition, the SRO has been shown to produce results consistent with official measures of delinquency (Chung & Steinberg, 2006; Elliott, Dunford & Huizinga, 1987). In the current study, excellent internal consistency was obtained for SRO total scores ( $\alpha = .92$ ) and good internal consistency for the violent ( $\alpha = .87$ ) and non-violent subscales ( $\alpha = .85$ ).

**Table 8. *Items in the Self-Report of Offending***

<b>Type of Offence</b>	<b>Items</b>
<b>Violent Offences</b>	Forced someone to have sex Shot at someone Shot and hit someone Taken something from another by force, using a weapon Taken something from another by force, without a weapon Physically attacked someone so badly that they needed a doctor Been in a fight Beaten up, threatened, or physically attacked someone Carried a gun
<b>Non-Violent Offences</b>	Purposely destroyed or damaged someone else's property Purposely set fire to a house, building, car, or vacant lot Entered or broken into a building to steal Stolen something from a store Bought, received, or sold something that was stolen Used checks or credit cards illegally Stolen a car or motorcycle to keep or sell Gone joyriding Entered or broken into a car to steal something from it Sold marijuana Sold other illegal drugs Carjacked someone Driving while drunk or high Paid for sex

## **Analytic Strategy**

### **Missing Data and Data Screening**

Prior to conducting major analyses, data were screened for missing data points, data entry errors, non-normality, and outliers. Missing data was dealt with by prorating the scale scores according to the instructions provided in the scoring manuals for each of the measures. For example, in terms of missing data on the risk items of the SAVRY,

the measure is deemed to be interpretable as long as there are no more than five unrated items (i.e., two or less items missing on the historical domain, one item missing on the social-contextual domain, and two or less items missing on the individual domain). The measure adjusts the weights of items in regards to missing items (i.e. if three items are missing scores are prorated as though there were only 21 items in the questionnaire). With respect to other measures included in the study, unless otherwise specified by the scoring manuals for each measure, cases were prorated if fewer than 25 percent of the items were missing. If at least 25 percent of items were missing, cases were deleted pairwise from the analysis that used the variable in question. Data entry errors were checked for by comparing the minimum and maximum values in the data set with the allowable minimum and maximum values for each variable. Data entry errors were dealt with by referring to hard copies of the interview protocols and entering in the correct information. Continuous variables were examined for non-normality through inspection of skew, kurtosis, and visual inspection of Q-Q plots. If any variables were non-normally distributed (i.e., skew or kurtosis  $> \pm 2$ ) they were also checked for outliers using z-score transformations, with absolute z-values greater than 3.5 identified as potential outliers. If non-normality and outliers were present on any continuous measures of protective factors included in the study, variables were transformed to make the distributions more normal. However, if non-normality and outliers were present on the SRO or official recidivism data nonparametric tests were used in subsequent analyses. Although common methodological practices for dealing with skewed count data include transforming the variable to be more normally distributed, this technique has drawn concern when applied to count data (Gardner, Mulvey, & Shaw, 1995). Gardner and colleagues (1995) argue that when there is a high prevalence of zeros (which is characteristics of the offending data in the current sample), transformations can produce distorted estimated variances, thereby producing misleading results.

### **Concurrent Validity between SAVRY Protective Items and Other Measures of Protective Factors**

Concurrent validity between protective items on the SAVRY and other measures of the protective factors included in the current study were examined using Pearson's product moment correlation ( $r$ ) and point-biserial correlation coefficient ( $r_{pb}$ ). Any significant positive correlations suggested that there was concurrent validity between the

two measures in question. In general, a correlation coefficient of .50 or larger represented a strong or large correlation, .30 represented a moderate correlation, and .10 represented a weak or small association (Cohen, 1988).

## **Key Analyses**

### **Research Question 1: Do non-gang and gang-involved youth offenders differ in risk and protective factors on the SAVRY, DAP, and other measures of protective factors included in the study?**

Analyses were conducted to determine (1) if the SAVRY could differentiate between gang and non-gang youth at a scale and item level, (2) which individual risk and protective items on the SAVRY were associated with gang involvement, and (3) if the other measures of protective factors included in the study could identify protective factors against gang involvement. First, mean differences between gang and non-gang youth on total and subscale scores of the SAVRY were examined using independent samples t-tests. If there was a significant difference between groups, item level differences on each of the SAVRY scales were also examined using chi-square tests to determine which individual risk and protective items were significantly associated with gang status. Next, gang and non-gang youth were compared on other measures of protective factors included in the study (i.e., DAP, Presence of Caring – IPFI, SSDP Parental Monitoring and Attachment to Parents, Hollingshead Index of Social Position) using independent samples t-tests.

### **Research Question 2: Is there a cumulative effect of multiple risk and multiple protective factors on gang involvement?**

To examine whether gang youth experienced an accumulation of risk factors and lack of protective factors, the relationship between the *number* of risk and protective factors and the prevalence of gang involvement were examined. Using a similar approach to Thornberry and colleagues (2003) and Esbensen and colleagues (2009), all individual risk and protective items found to be significantly associated with gang involvement in the previous analysis were combined into single item counts of risk or protective factors. In order to combine dichotomous, ordinal, and interval level data for these indices, all variables were rendered dichotomous. For each of the SAVRY risk

items, a score of moderate or high on the item was taken as an indication that the risk factor was present. With respect to interval level measures of protective factors, following Farrington and Loeber's (2000) recommendation, a youth was classified as having a protective factor rated as present if they scored in the top quartile of all youth on the measure. This is argued to be a more conservative approach to dichotomizing interval level data, as other approaches such as a median split may over identify youth with protective factors (see Thornberry et al., 2003). Next, the percentage of gang and non-gang youth with each number of risk and protective factors was examined. To examine the threshold in which cumulative effects of risk and protective factors were associated with increases or decreases in risk of gang involvement, odds ratios (ORs) were calculated for gang involvement for each number of risk and protective factors using the following formula: [odds ratio = Probability of Gang Involvement (P)/ 1-Probability of gang involvement (1-P)], where (P = number of gang youth with X factors/ Total number of gang youth) and X equals the number of risk or protective factors present in the youth. Odds ratios greater than one indicated an increased likelihood of gang involvement.

**Research Question 3: What is the effect of gang involvement on the time and frequency of offending, controlling for the effects of the risk and protective factors associated with gang membership?**

To address the third research question, first, bivariate comparisons in the number and types of offences (i.e., any, violent, non-violent) committed over the follow-up period between gang and non-gang youth were conducted. Because SRO and official offence data were significantly skewed count variables, Mann-Whitney U tests were used to compare differences between two groups. The Mann-Whitney U test is similar to the independent samples t-test in that it is also used for interval data, but is used when the dependent variable is not normally distributed and instead of comparing the mean it compares the median between two groups. Mann-Whitney U tests were conducted separately for each follow-up period (i.e., 3 months, 12 months, and for official data only, the average 4-year follow-up period). In addition, Mann-Whitney U tests were conducted to examine whether gang and non-gang youth differed in the total number of offences committed at any point during the average 4-year follow-up period. Due to limitations with combining Likert-items on the SRO across follow-up intervals and that no self-report

data was available after the 12-month follow-up, only official records were used to examine whether gang and non-gang youth differed in the total number of offences during the study period.

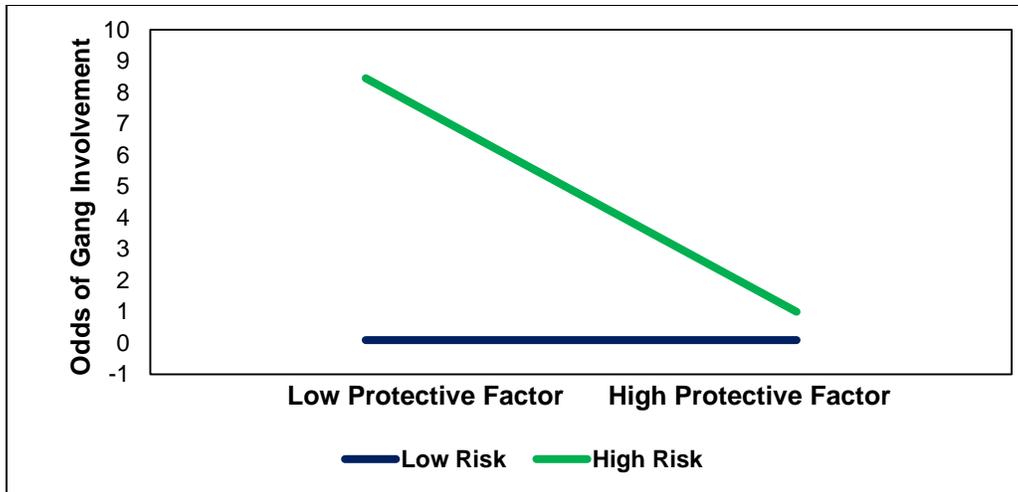
Next, negative binomial analyses were conducted to explore whether gang membership predicted any new offences at each follow-up period, controlling for the risk and protective factors associated with gang membership. Length of time spent in custody during each follow-up interval was controlled for to account for decreased opportunities to offend. Negative binomial regression, a nonlinear regression technique, is well suited for highly skewed count data with many zero values (e.g., number of arrests). Control variables and gang involvement were entered simultaneously into the model rather than sequentially. Although incremental predictive validity is normally tested with a sequential block entry method (i.e., control variables are entered in the first step of a regression model and the covariate of interest is entered at the second step), Greene (2002) has suggested that this approach is neither applicable nor appropriate for modeling count data. This is because the proportion of explained variance in the outcome beyond what is achieved by the control variables at Step 1 cannot be determined. Incremental validity can be tested with count data, but instead of a hierarchical regression model where the variables are entered sequentially the variables must be entered simultaneously into the model (see Greene, 2002).

Last, because the analyses described above do not take into account between-subject variability in the length of potential or actual follow-up (i.e., time-at-risk), the relationship between gang status and offending was also examined using survival analysis controlling for the risk and protective factors associated with gang membership and the number of days spent in a custody facility during the follow-up period. Survival analysis is a technique that takes into account the length of time until reoffending and speed of reoffending, thus allowing for the inclusion of individuals with different follow-up times in the same analysis (Hosmer & Lemeshow, 1991). Time-at-risk was calculated as the number of days between the date of baseline data collection and one of two subsequent dates: date of charge/conviction (violent, non-violent, or any) or end of the longest follow-up interval (i.e., 5.58 years or April 25, 2014). Cox regression analysis, which allows for the analysis of the effect of several covariates on survival, was applied to examine differences in recidivism rates over the average 4-year period, using length

of time until recidivism as the outcome measure. Censored cases were defined as those in which the youth did not reoffend. For each offence type (i.e., any, violent, non-violent), the median survival time was reported as a function of gang membership and for the sample as a whole. In addition, the hazard function was plotted separately for gang-involved and non-gang involved youth.

**Research Question 4: Do protective factors moderate or mediate the relationship between risk factors and gang involvement?**

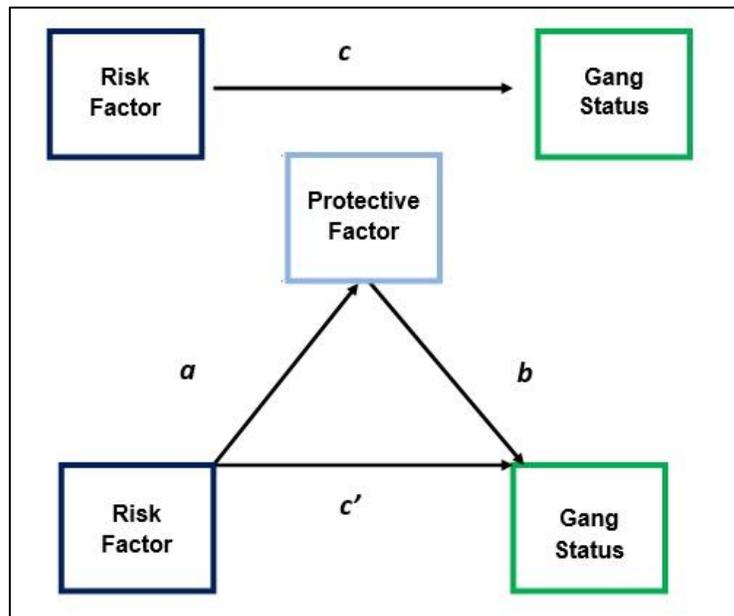
A series of logistic regression analyses were conducted to examine whether protective factors had an indirect effect on gang involvement. An indirect effect was considered present if any of the protective factors significantly moderated or mediated the relationship between risk factors and gang involvement. In the first set of analyses, following the guidelines of Baron and Kenny (1985), moderation effects were tested for by entering scores on the cumulative risk index and protective factor scores (e.g., SAVRY Total Protective score) in the first step of a logistic regression model followed by their interaction in the second step. Before the regression analyses were run, all continuous variables were mean centered around zero. This helped prevent multicollinearity among the predictors and the interaction terms in the equation. A moderation effect was believed to have occurred if protective factors altered the strength and/or direction of the relationship between risk factors and gang involvement. Of particular interest in this analysis was if protective factors could mitigate the effects of risk factors on gang involvement when risk factors were high (see Figure 1) and whether there was a single protective factor that was effective at reducing the risk of gang involvement when multiple risk factors were present.



**Figure 1. Moderation Model: Protective Factor Reduces the Risk of Gang Involvement**

In the second set of analyses, whether any of the protective factors mediated the relationship between risk factors and gang involvement was examined. A mediation effect was believed to have occurred if protective factors could partially or fully account for the relationship between risk factors and gang involvement. That is, once the influence of protective factors was partialled out, the relationship between the risk factor and gang involvement disappeared or was attenuated (i.e., partial mediation). For example, a (lack of) protective factors might be a mediator variable in that it explains why there is a relationship between risk factors and gang involvement (e.g., the presence of a risk factor results in the absence of a protective factor, thereby increasing the risk of gang involvement). When the effects of protective factors on gang involvement are removed, the relationship between risk factors and gang involvement may disappear. Following the guidelines of Baron and Kenny (1986), the significance of the regression coefficients were examined at several steps (see Figure 2). In the first step, gang involvement was regressed on the cumulative risk index to establish whether there was an effect that could be mediated (test path c). Second, the protective factor was regressed on the cumulative risk index to establish whether the protective factor was correlated with the risk factor (test path a). Third, gang involvement was regressed on protective factor and risk factor scores simultaneously to establish whether the protective factor affected gang involvement while controlling for the effects of risk factors (test path b). Fourth, if the effect of the risk factor on gang involvement controlling for the protective factor (test path c') was zero, full mediation was believed to have occurred. If

the first three steps were met but not Step 4, then partial mediation was to believe to have occurred. To confirm if full or partial mediation had been established, Sobel's (1982) test of the significance of the indirect effect of risk factors on gang involvement through protective factors was also conducted. Again, of interest in this analysis was whether there was a single protective factor that mediated the effects of risk factors on gang involvement when multiple risk factors were present.

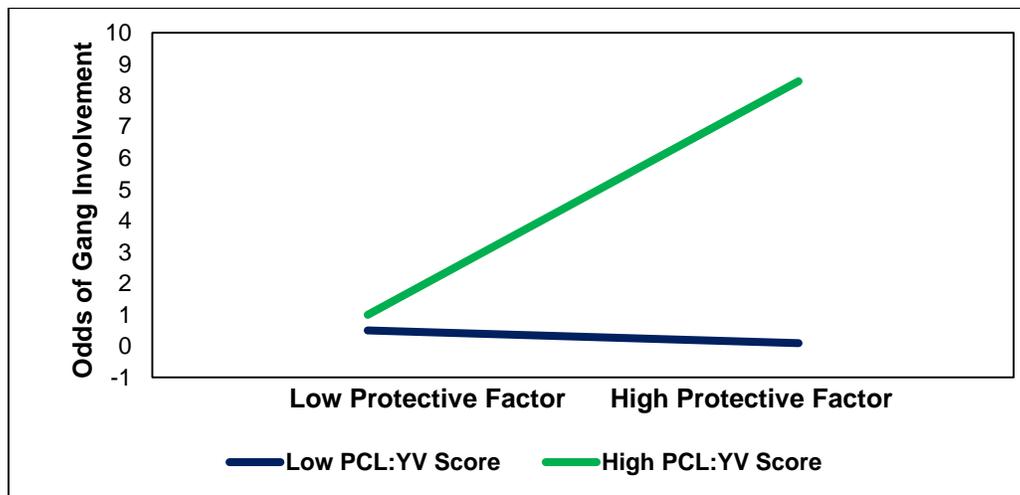


**Figure 2. Mediation Model: Protective Factor Accounts for the Relationship between Risk Factor and Gang Involvement**

**Research Question 5: Do protective factors moderate or mediate the relationship between psychopathy and gang involvement?**

To examine whether any of the protective factors included in the study moderated or mediated the relationship between psychopathic personality traits, as indicated by total and factor scores on the PCL:YV, and gang involvement, a series of logistic regression analyses were conducted following the recommendations of Baron and Kenny (1986) outlined above. Due to the restricted range of total PCL:YV scores in the sample (i.e., 0-32), participants were grouped as to whether they scored higher or lower than the mean value (16.15) on the PCL:YV using a mean split prior to analysis. To test for an interaction, PCL:YV score (high/low) and score on the protective factor

measure were entered into the first step of a regression model, followed by their interaction in the second step. All continuous variables were mean centered prior to creating the product term. Specifically this analysis was conducted to examine whether any protective factors reduced the likelihood of gang involvement or exacerbated risk of gang involvement for youth with psychopathic traits (see Figure 3). Next, mediation analyses were conducted to determine whether protective factors could partially or fully account for the relationship between psychopathy and gang involvement.



**Figure 3. Moderation Model: Protective Factor Aggravates the Risk of Gang Involvement**

### Supplementary Analyses

Each of the key analyses outlined above were also conducted separately for (a) youth who self-reported gang involvement and those who were identified as gang-involved through both self-report and youth justice files and (b) youth who reported past gang involvement and youth who reported both current and past gang involvement. Any significant differences between groups were reported.

### Type I and Type II Error Control

To control for a type I error (i.e., rejecting the null hypothesis when the null hypothesis is true) the alpha levels were set at .05 for all tests. For multiple comparisons Bonferroni correction (i.e.,  $p = .05 / \text{number of comparisons}$ ) was applied, and significant

results before and after Bonferroni correction were reported. To control for a type II error (i.e., retaining the null hypothesis when the null hypothesis is false) a priori power analyses were conducted to determine whether the sample size included in the current study was sufficient for each of the planned analyses. For each analysis, unless otherwise specified, power was calculated using the effect sizes recommended in the literature (e.g., Cohen, 1988). In Table 9, the number of participants required to detect small, medium, and large effects size when power of .80 with an alpha level of .05 are provided. A priori analyses suggested that for most of the planned bivariate analyses, the sample size was large enough to control for the occurrence of a Type II error if medium or large effect sizes are observed in the study.

**Table 9. Required Sample Size for Bivariate Analyses**

Analysis	Required Sample Size		
	Small Effect	Medium Effect	Large Effect
Chi-square †	1,195	133	45
T-Test ††	620	102	52
Mann-Whitney U †††	717	118	60
Correlation †††	783	85	28

*Note.* Estimates above are based on a power of .80 with alpha level of .05 (two-tailed).

†  $\phi$  or Cramer's  $v = .10$  (small effect),  $.30$  (moderate effect), and  $.50$  (large effect)

†† Cohen's  $d = .30$  (small effect)  $.50$  (moderate effect), and  $.80$  (large effect)

†††  $r = .10$  (small effect),  $.30$  (moderate effect), and  $.50$  (large effect)

A priori analyses were also conducted to determine the sample size required for negative binomial and Cox regression analysis. Following the guidelines of Peduzzi and colleagues (1996), adequate sample size for negative binomial regression analysis were determined using the following formula:  $N = 10 k/p$ , where  $k$  equals the number of independent variables to be included in the model and  $p$  equals the smallest proportion of negative or positive cases in the population (i.e., youth that were gang or non-gang members). With four variables to include in the model and the proportion of positive cases (i.e., number of gang-involved youth) equal to 30.35%, the minimum number of cases required to detect at a small effect was 98. This formula was also applied to

determine sample size required for Cox regression (see Peduzzi et al., 1996), but with  $p$  in the Cox regression model equation equal to the proportion of positive cases that reached the endpoint (i.e., proportion of youth that reoffended at the end of the average four-year follow-up interval). Given a recidivism rate at least equal to other studies of gang and non-gang youth offenders (i.e., 45%; e.g., Thornberry & Burch, 1997) with four variables in the model, the minimum number of cases required to detect a small effect was 89 for Cox regression models. Thus, sample size seemed sufficient for each of the planned negative binomial and Cox regression analyses. Further, although there is still considerable debate about how to calculate the minimum sample size need per independent variable in multivariate analyses, sample size was sufficient according to the rule of thumb that ten sample size members per one independent variable is appropriate (Harrel et al., 1985; Peduzzi et al., 1996; Vittinghoff & McCulloch, 2007).

Last, a priori analyses were conducted to determine the sample size required to test moderation and mediation effects in a logistic regression analysis. Although there are no clear guidelines on the required sample size for testing interaction effects in logistic regression, Weiberg (2009) has suggested that sample size required should be four-fold what would be needed to detect a single main effect of a similar magnitude. Thus, following the guidelines of Peduzzi and colleagues (1996), adequate sample size for logistic regression analyses were determined using the following formula:  $N = 10 k/p$ . With one main effect in the model and the proportion of gang-involved youth equal to 30.35%, the minimum number of cases required was 33. Multiplying that number by four, the minimum number of required cases to detect a small interaction effect (i.e., odds ratio) was 132. Thus, although analyses were underpowered to detect a small interaction, if medium or large effect sizes are observed in the study the current sample size of 112 may be sufficient. With respect to mediation analyses, sample size required for Sobel's (1982) test was determined using the guidelines provided by Fritz and MacKinnon (2007; see Table 10). A priori analyses suggest that for most of the planned mediation analyses, the sample size was large enough to control for the occurrence of a Type II error if both the  $a$  (i.e., association between the risk and protective factor) and  $b$  paths (i.e., association between the protective factor and gang involvement) in the mediation model correspond to medium or large effects.

**Table 10. Required Sample Size for the Sobel (1982) Test**

<b>Path B<sup>††</sup></b>	<b>Path A<sup>†</sup></b>		
	<b>Small Effect</b>	<b>Medium Effect</b>	<b>Large Effect</b>
Small Effect	667	422	412
Medium Effect	421	90	66
Large Effect	410	67	42

*Note.* Estimates above are based on  $r = .10$  (small effect),  $.30$  (moderate effect), and  $.50$  (large effect).

<sup>†</sup> Path A = Association between risk and protective factor.

<sup>††</sup> Path B = Association between protective factor and gang involvement.

## Chapter 7. Results

### Sample Attrition, Missing Values, and Data Screening

From the baseline assessment to the 3-month follow-up, six gang and 12 non-gang offenders dropped out of the study. From 3-month to 12-month follow-up an additional seven gang and five non-gang offenders dropped out of the study. This resulted in total attrition rates of 38.23% and 21.79% for gang and non-gang youth, respectively. Fisher's exact test indicated that difference in drop-out rates was not statistically significant between the two groups at the 3-month follow-up,  $\chi^2(1, N = 112) = 3.15, p = .07$ , or the 12-month follow-up,  $\chi^2(1, N = 94) = 0.72, p = .36$ . Independent samples t-tests, chi-square tests, and Fisher's exact tests indicated that completers did not significantly differ from non-completers on any demographic (e.g., age, race) or offending characteristics (e.g., index offence, age of first arrest, number of arrests). In addition, completers did not significantly differ between non-completers on any risk or protective factors measured in the study. There were no significant differences with respect to drop out rates, demographic or offending characteristics, and risk or protective factors as a function of when the youth was gang-involved (i.e., in the past vs. both past and currently) or how the youth was identified as a gang member (i.e., self-report vs. both self-report and official records).

Participants were included in the study if they missed one follow-up but completed subsequent ones. As result, a total of 24.64% ( $n = 9$ ) of gang and 23.08% ( $n = 18$ ) non-gang offenders had missing SRO data at the three-month interview and 50.00% ( $n = 17$ ) of gang and 40.30% ( $n = 31$ ) non-gang youth had missing SRO data at the 12-month follow-up. Reasons for failure to complete a follow-up, in most cases, were that youth were not interested in further participation or that research assistants were unable to reach the youth to schedule an appointment. In cases where self-report information was unavailable, it was possible to examine official recidivism records to determine re-offence rates in the sample. File information was not available for five

cases (one gang and four non-gang youth) because these youth were no longer on probation. With regards to other measures included in the study, there were no missing values on any of the following baseline measures: SAVRY, DAP, SSDP Attachment to Parents and Parental Supervision, Presence of Caring, and PCL:YV.

Major study variables were all examined for univariate outliers and normality (i.e., skewness and kurtosis, see Table 11). As illustrated in Table 11, SRO and official recidivism variables had significant positive skew. Due to the non-normal SRO and official recidivism variables, non-parametric tests were used when examining these variables in subsequent analyses. No univariate outliers (i.e.,  $z$  values  $\geq 3.5$ ) were identified on any of the variables.

## **Rates of Self-Reported and Official Offending**

With regards to rates of offending in the sample, official records indicate that at the 3-month follow-up, 25.23% ( $n = 27$ ) of the sample committed at least one new offence. However, almost three-quarters (69.04%,  $n = 58$ ) of the sample self-reported that they had committed at least one offence since the baseline assessment. At the 12 month follow-up, official records indicated 14.95% ( $n = 16$ ) of the sample had committed at least one new offence. Again, self-reported offences were higher; 57.14% ( $n = 36$ ) of the sample had committed at least one offence at the 12-month follow-up. Over the average 4-year follow-up period, official records indicate that 55.14% ( $n = 59$ ) of the sample had committed at least one new offence.

**Table 11. Psychometric Properties of Major Study Variables**

	<i>M (SD)</i>	Range	Skew	Kurtosis
<b>SAVRY</b>				
Total Risk	26.13 (8.52)	7- 43	-0.13	-0.49
Historical	10.65 (3.99)	1 - 19	0.01	-0.55
Social-Contextual	6.26 (2.36)	1 - 12	0.05	-0.50
Individual	9.25 (3.63)	0 - 16	-0.33	-0.43
Protective	1.35 (1.55)	0 - 6	1.31	1.26
<b>DAP</b>				
Social Competencies	13.18 (4.16)	3 - 23	0.19	-0.38
Positive Identity	10.80 (3.63)	2 - 17	-0.42	-0.45
Positive Values	18.26 (5.59)	6 - 33	0.16	-0.37
Empowerment	11.92 (3.33)	0 - 18	-0.52	0.70
Commitment to Learning	10.99 (4.38)	2 - 21	0.17	-0.77
Constructive Use of Time	4.62 (2.89)	0 - 12	0.36	-0.34
School Expectations	6.21 (2.27)	0 - 9	-0.78	0.18
Neighbourhood Cohesion	4.33 (1.98)	0 - 9	0.10	-0.13
<b>SSDP</b>				
Parental Supervision	22.57 (5.32)	8 - 32	-0.51	0.26
Attachment to Parents	9.55 (3.13)	2 - 16	0.10	-0.52
Presence of Caring – IPFI	16.73 (3.26)	5 - 20	-1.14	1.17
Hollingshead’s Index	21.94 (7.23)	7 - 34	-0.54	-0.41
<b>PCL :YV</b>				
Total	16.15 (7.57)	3 - 32	0.29	-0.70
Factor 1	2.05 (1.96)	0 - 8	0.85	0.13
Factor 2	2.92 (2.16)	0 - 8	0.52	-0.61
Factor 3	4.56 (2.31)	0 - 10	0.12	-0.65
Factor 4	5.70 (2.55)	0 - 10	-0.13	-0.76
<b>SRO (3 Month)</b>				
Any	3.78 (6.23)	0 - 31	2.68	7.99
Violent	1.89 (2.89)	0 - 13	2.04	4.28
Non-Violent	2.30 (3.49)	0 - 16	2.17	5.27
<b>SRO (12 Month)</b>				
Any	3.77 (6.23)	0 - 31	2.68	7.99
Violent	1.47 (3.13)	0 – 18	3.29	13.00
Non-Violent	2.30 (3.49)	0 – 16	2.17	5.27

Note. *M* = Mean. *SD* = Standard Deviation.

**Table 11. Psychometric Properties of Major Study Variables (Continued)**

	<i>M (SD)</i>	Range	Skew	Kurtosis
<b>Official Offences (3 Month)</b>				
Any	0.98 (2.19)	0 - 11	2.73	7.55
Violent	0.20 (0.83)	0 - 6	5.00	27.83
Non-Violent	0.77 (1.70)	0 - 8	2.57	6.31
<b>Official Offences (12 Month)</b>				
Any	2.45 (4.53)	0 - 26	2.76	8.89
Violent	0.51 (1.44)	0 - 7	3.13	9.43
Non-Violent	1.91 (3.43)	0 - 19	2.62	7.90
<b>Official Offences (Avg. 4-Year)</b>				
Any	6.4 (12.81)	0 - 95	4.37	24.17
Violent	2.04 (4.81)	0 - 37	4.56	26.92
Non-Violent	4.36 (8.44)	0 - 58	3.94	19.32

Note. *M* = Mean. *SD* = Standard Deviation.

## **Concurrent Validity between SAVRY Protective Items and Other Measures of Protective Factors**

Concurrent validity between protective items on the SAVRY and other measures of protective factors included in the current study were examined using correlation analyses (see Table 12). With regards to overlap between SAVRY protective factors and other measures included in the study, (P1) Prosocial Involvement was most strongly related to Social Competency and Constructive Use of Time on the DAP; (P2) Strong Social Support was most strongly related to Attachment to Parents and Presence of Caring; (P3) Strong Attachment and Bonds was most strongly related to Attachment to Parents and Neighbourhood Cohesion; (P4) Positive Attitudes towards Intervention and Authority was most strongly related to Commitment to Learning, Social Competency, and Positive Values; (P5) Commitment to School was most strongly related to Commitment to Learning, and (P6) Resilient Personality was most strongly related to Positive Values and Commitment to Learning. However, correlations were only moderate, suggesting that while there was some overlap, these constructs also

possessed a fair amount of independent variance (i.e., tapped into different aspects of protection).

**Table 12. Concurrent Validity between SAVRY Protective Items and Other Measures of Protective Factors**

	P1	P2	P3	P4	P5	P6
<b>DAP</b>						
Social Competencies	.39**	.15	.05	.24*	.09	.16
Positive Identity	.27**	.08	-.03	.01	.05	.10
Positive Values	.39**	.14	.09	.24*	.13	.21*
Empowerment	.25**	.12	.25**	.16	.08	.13
Commitment to Learning	.21*	.09	.10	.26**	.19*	.22*
Constructive use of Time	.38**	.08	.08	.20*	.05	.14
School Expectations	.22*	.14	.19*	.15	.05	.09
Neighbourhood Cohesion	.22*	.10	.36**	.17	-.03	.09
<b>SSDP</b>						
Parental Supervision	.00	.06	.08	-.00	-.00	.12
Attachment to Parents	.13	.21*	.32**	.16	-.13	.09
Presence of Caring – IPFI	.09	.21*	.17	.08	-.08	.16
Hollingshead’s Index	.21*	.24*	.05	.12	.10	.12

*Note.* P1 = Prosocial Involvement, P2 = Strong Social Support, P3 = Strong Attachment and Bonds, P4 = Positive Attitudes towards Invention and Authority, P5 = Strong Commitment to School/Work and P6 = Resilient Personality Traits on the SAVRY.

### **Research Question 1: Do non-gang and gang-involved youth offenders differ in risk and protective factors on the SAVRY, DAP, and other measures of protective factors included in the study?**

Comparisons were made between gang and non-gang youth to determine whether risk and protective factors varied as a function of gang status. The first set of comparisons examined SAVRY total, subscale, and item scores using independent samples t-test and chi-square analyses. Total scores and subscale scores did not significantly differ as a function of when the youth was gang-involved (i.e., in the past or both in the past and currently) or how the youth was identified as a gang member (i.e., self-report or both self-report and official records); therefore, groups were collapsed for

analysis. Prior to conducting t-tests, assumption checks on normality of each population and homogeneity of variance were conducted using Komolgorov-Smirnov and Levene's tests, respectively. Komolgorov-Smirnov tests indicate that for both gang and non-gang involved youth, scores on the Social-Contextual [ $D(78) = 0.13, p = .04; D(34) = 0.23, p = .00$ ] and Protective scales [ $D(78) = 0.23, p = .00; D(34) = 0.27, p = .00$ ] were significantly non-normal, however for all other subscales the assumption of normality of each population was met. The results of Levene's test indicated that there was equal variance between gang and non-gang youth on the Historical, Social-Contextual, Individual, and Total Risk scales of the SAVRY, but for Protective scale scores, variances were significantly different in the two groups,  $F(1, 110) = 8.03, p = .02$ . As such, the  $t$ -statistic for the Protective scale was reported using corrected degrees of freedom. Results of the independent samples t-test indicated that compared to non-gang involved offenders, gang-involved offenders had significantly higher scores on measures of risk, as indicated by scores on Total, Historical, Social-Contextual, and Individual risk scales of the SAVRY (see Table 13). In addition, gang-involved youth scored significantly lower on measures of protective factors compared to their non-gang involved peers.

**Table 13. SAVRY Total and Subscale Scores as a Function of Gang Status**

Scale	Non-Gang Youth ( <i>n</i> = 78)	Gang-Youth ( <i>n</i> = 34)	<i>t</i> ( <i>df</i> ), <i>p</i> , Cohen's <i>d</i>
<b>Risk</b>			
Total Risk	23.89 (7.52)	31.26 (8.55)	<i>t</i> (110) = 4.57, <i>p</i> = .00, <i>d</i> = 0.92
Historical	9.64 (3.58)	12.94 (3.97)	<i>t</i> (110) = 4.33, <i>p</i> = .00, <i>d</i> = 0.87
Social-Contextual	5.74 (2.12)	7.44 (7.44)	<i>t</i> (110) = 3.70, <i>p</i> = .00, <i>d</i> = 0.74
Individual	8.53 (3.33)	10.88 (3.80)	<i>t</i> (110) = 3.28, <i>p</i> = .00, <i>d</i> = 0.66
<b>Protective</b>	1.55 (1.69)	0.88 (1.04)	<i>t</i> (97.75) = - 2.56, <i>p</i> = .01, <i>d</i> = 0.47

Note. Mean (Standard Deviation). *df* = Degrees of Freedom.

Next, to examine whether any risk or protective items on the SAVRY were uniquely associated with gang involvement, item ratings were submitted to chi-square analyses. Fisher's Exact test was reported for items that violated the chi-square assumption of expected counts. Analyses indicated that there were significant differences at the item level for 11 of the 24 risk items analyzed (see Table 14). With regards to items on the Historical risk scale, gang-involved youth were more likely than non-gang youth to have the following historical risk factors rated as present: (H2) History of Non-Violent offending, (H3) Early Initiation of Violence, (H6) Exposure to Violence in the Home, (H7) Childhood History of Maltreatment, (H8) Parental/Caregiver Criminality (H8), and (H9) Early Caregiver Disruption.<sup>6</sup> With regards to items on the Social-Contextual risk scale, compared to non-gang youth, gang youth were more likely to have the following social-contextual risk factors rated as present: (SC11) Peer Delinquency and (SC16) Community Disorganization.<sup>7</sup> With regards to items on the Individual risk scale, gang youth were more likely than non-gang involved youth to have the following items rated as present: (I17) Negative Attitudes, (I18) Risk Taking/Impulsivity, and (I19)

<sup>6</sup> After Bonferroni correction (i.e., .05/10 = *p* < .005) only (H6) Exposure to Violence in the Home and (H9) Early Caregiver Disruption were significant.

<sup>7</sup> After Bonferroni correction (i.e., .05/6 = *p* < .008) only (SC16) Community Disorganization was significant.

Substance Use Difficulties.<sup>8</sup> Last, with respect to protective factors, analyses indicated that there were significant differences at the item level for two of the six protective items analyzed (see Table 15). Compared to their gang-involved peers, non-gang affiliated youth were more likely to have Strong Attachment and Bonds (P3) and Resilient Personality, rated as present on the SAVRY.<sup>9</sup>

<sup>8</sup> After Bonferroni correction (i.e.,  $.05/8 = p < .006$ ) only (I18) Risk Taking/Impulsivity and (I19) Substance Use Difficulties were significant.

<sup>9</sup> After Bonferroni correction (i.e.,  $.05/6 = p < .008$ ) neither protective factor was significant.

**Table 14. SAVRY Risk Items as a Function of Gang Status**

SAVRY Risk Item	$\chi^2$ (df), $p$ , Cramer's $V$
<b>Historical Items</b>	
(H1) History of Violence	$\chi^2$ (2) = 5.14, $p$ = .08, $V$ = 0.21
(H2) History of Non-Violent Offending	$\chi^2$ (2) = 6.23, $p$ = .04, $V$ = 0.24
(H3) Early Initiation of Violence	$\chi^2$ (2) = 7.86, $p$ = .02, $V$ = 0.27
(H4) Early Supervision/Invention Failure	$\chi^2$ (2) = 4.11, $p$ = .13, $V$ = 0.19
(H5) History of Self-Harm/Suicide Attempts	$\chi^2$ (2) = 1.10, $p$ = .58, $V$ = 0.10
(H6) Exposure to Violence in the Home	$\chi^2$ (2) = 15.0, $p$ = .001, $V$ = 0.37
(H7) Childhood History of Maltreatment	$\chi^2$ (2) = 6.53, $p$ = .04, $V$ = 0.24,
(H8) Parental/Caregiver Criminality	$\chi^2$ (2) = 6.92, $p$ = .03, $V$ = 0.25
(H9) Early Caregiver Disruption	$\chi^2$ (2) = 17.68, $p$ = .00, $V$ = 0.40.
(H10) Poor School Achievement	$\chi^2$ (2) = 1.53, $p$ = .47, $V$ = 0.12
<b>Social/Contextual Items</b>	
(SC11) Peer Delinquency	$\chi^2$ (2) = 9.27, $p$ = .03, $V$ = 0.29
(SC12) Peer Rejection	$\chi^2$ (2) = 1.08, $p$ = .58, $V$ = 0.10
(SC13) Stress and Poor Coping	$\chi^2$ (2) = 2.59, $p$ = .27, $V$ = 0.15
(SC14) Poor Parental Management	$\chi^2$ (2) = 2.87, $p$ = .24, $V$ = 0.16
(SC15) Lack of Personal/Social Support	$\chi^2$ (2) = 1.96, $p$ = .38, $V$ = 0.13
(SC16) Community Disorganization	$\chi^2$ (2) = 12.67, $p$ = .002, $V$ = 0.36
<b>Individual Items</b>	
(I17) Negative Attitudes	$\chi^2$ (2) = 7.70, $p$ = .02, $V$ = 0.26
(I18) Risk Taking and Impulsivity	$\chi^2$ (2) = 15.00, $p$ = .001, $V$ = 0.36
(I19) Substance Use Difficulties	$\chi^2$ (2) = 13.73, $p$ = .001, $V$ = 0.35
(I20) Anger Management Problems	$\chi^2$ (2) = 5.26, $p$ = .07, $V$ = 0.22
(I21) Low Empathy/Remorse	$\chi^2$ (2) = 2.98, $p$ = .23, $V$ = 0.16
(I22) Attention Deficit/Hyperactivity Difficulty	$\chi^2$ (2) = 1.24, $p$ = .54, $V$ = 0.11
(I23) Poor Compliance	$\chi^2$ (2) = 4.53, $p$ = .10, $V$ = 0.20
(I24) Low Commitment to School/Work	$\chi^2$ (2) = 1.30, $p$ = .53, $V$ = 0.11

Note. df = Degrees of Freedom.

**Table 15. SAVRY Protective Items as a Function of Gang Status**

SAVRY Protective Item	$\chi^2$ (df), $p$ , $\phi$
(P1) Prosocial Involvement	$\chi^2$ (1) = 0.96, $p$ = .33, $\phi$ = 0.09
(P2) Strong Social Support	$\chi^2$ (1) = 1.63, $p$ = .20, $\phi$ = 0.12
(P3) Strong Attachment and Bonds	$\chi^2$ (1) = 5.84, $p$ = .01, $\phi$ = 0.24
(P4) Positive Attitudes Intervention/Authority	$\chi^2$ (1) = 0.52, $p$ = .47, $\phi$ = 0.07
(P5) Strong Commitment School/Work	$\chi^2$ (1) = 0.01, $p$ = .97, $\phi$ = 0.00
(P6) Resilient Personality	$\chi^2$ (1) = 3.95, $p$ = .04, $\phi$ = 0.20

Note. df = Degrees of Freedom.

The second set of comparisons examined scores on other measures of protective factors included in the study (e.g., DAP, Attachment to Parents, Presence of Caring - IPFI) using independent samples t-tests. Scores did not significantly differ as a function of when the youth was gang-involved (i.e., in the past or both in the past and currently) or how the youth was identified as a gang member (i.e., self-report or both self-report and official records); therefore, groups were collapsed for analysis. Results of the independent samples t-test indicated that compared to gang-involved youth, non-gang youth had a significantly higher degree of parental monitoring (see Table 16). A somewhat unexpected finding was that gang youth scored significantly higher than non-gang youth on Positive Identity<sup>10</sup> and Constructive Use of Time.<sup>11</sup> There were no significant differences of any of the other measures of protective factors.<sup>12</sup>

<sup>10</sup> With regards to individual items on the Positive Identity Scale, gang youth were more likely to report feeling good about themselves,  $\chi^2$  (3) = 13.68,  $p$  = .003,  $V$  = 0.35, and feeling good about their future,  $\chi^2$  (3) = 10.40,  $p$  = .02,  $V$  = 0.31, compared to non-gang youth. No differences between gang and non-gang youth were observed with respect to feeling in control of their lives or dealing with frustration or overcoming challenges in positive ways.

<sup>11</sup> With regards to individual items on the Constructive Use of Time Scale, gang youth were more likely to report frequent involvement in creative activities (e.g., art, music theatre) than non-gang youth,  $\chi^2$  (3) = 10.54,  $p$  = .01,  $V$  = 0.31. No differences between gang and non-gang youth were observed with respect to their involvement in religious groups, sports, clubs or other activities, or spending quality time at home with family.

<sup>12</sup> After Bonferroni correction (.05/12 =  $p$  < .004) only Positive Identity and Parental Supervision were significant.

**Table 16. Other Measures of Protective Factors as a Function of Gang Status**

Scale	Non-Gang Youth ( <i>n</i> = 78)	Gang-Youth ( <i>n</i> = 34)	<i>t</i> (df), <i>p</i> , Cohen's <i>d</i>
<b>DAP</b>			
Social Competencies	13.37 (4.29)	12.76 (3.89)	<i>t</i> (110) = 0.71, <i>p</i> = .48, <i>d</i> = 0.15
Positive Identity	10.31 (3.85)	11.94 (2.28)	<i>t</i> (110) = -2.23, <i>p</i> = .03, <i>d</i> = 0.51
Positive Values	18.09 (5.74)	18.67 (5.27)	<i>t</i> (110) = -0.02, <i>p</i> = .87, <i>d</i> = 0.11
Empowerment	11.88 (3.21)	12.00 (3.65)	<i>t</i> (110) = -0.51, <i>p</i> = .61, <i>d</i> = 0.03
Commitment to Learning	11.03 (4.19)	10.88 (4.84)	<i>t</i> (110) = 0.17, <i>p</i> = .86, <i>d</i> = 0.03
Constructive Use of Time	4.22 (2.58)	5.53 (3.35)	<i>t</i> (110) = -2.49, <i>p</i> = .027, <i>d</i> = 0.47
School Expectations	6.41 (2.06)	5.73 (2.66)	<i>t</i> (110) = 1.45, <i>p</i> = .15, <i>d</i> = 0.29
Neighbourhood Cohesion	4.53 (1.95)	3.85 (2.00)	<i>t</i> (110) = 1.69, <i>p</i> = .09, <i>d</i> = 0.34
<b>SSDP</b>			
Parental Supervision	23.23 (5.28)	21.03 (5.18)	<i>t</i> (110) = 2.01, <i>p</i> = .04, <i>d</i> = 0.38
Attachment to Parents	9.89 (3.00)	8.94 (3.43)	<i>t</i> (110) = 1.48, <i>p</i> = .14, <i>d</i> = 0.29
Presence of Caring – IPFI	2.87 (1.15)	3.02 (1.11)	<i>t</i> (110) = -0.67, <i>p</i> = .50, <i>d</i> = 0.13
Hollingshead's Index	22.53 (7.30)	20.57 (7.00)	<i>t</i> (110) = 1.36, <i>p</i> = .19, <i>d</i> = 0.27

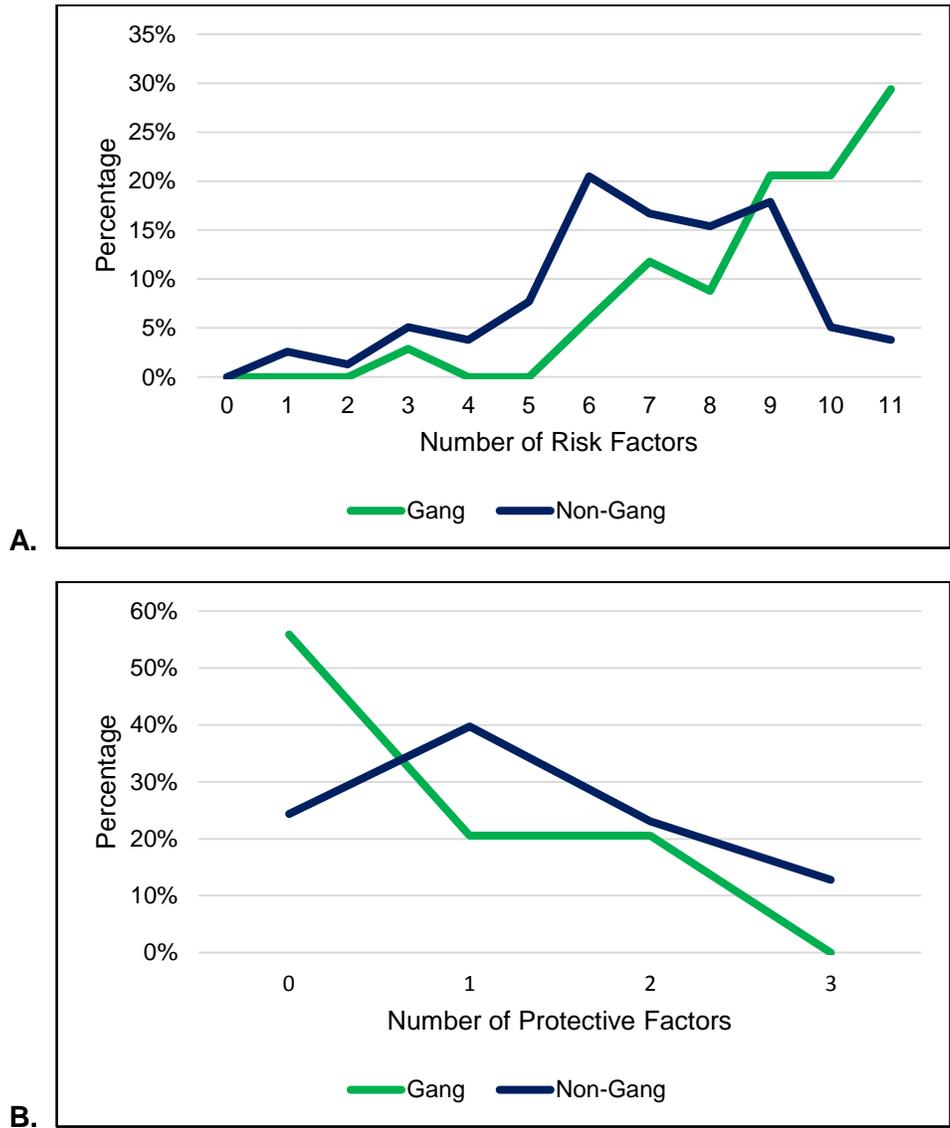
Note. Mean (Standard Deviation). df = Degrees of Freedom.

## Research Question 2: Is there a cumulative effect of multiple risk factors and multiple protective factors on gang involvement?

To examine whether cumulative effects of risk and protective factors were associated with increases or decreases in the risk of gang involvement, the 11 risk items and three protective items (i.e., items that were negatively associated with gang involvement) found to be significantly associated with gang involvement in previous analyses were summed to create cumulative risk and protective indices. For these indices, all variables were rendered dichotomous. For each of the SAVRY risk items a score of moderate or high on the item was taken as indication that the risk factor was present while a score of low was taken as indication that the item was absent. With regards to the Parental Monitoring, following the recommendations of Farrington and Loeber (2000) for continuous measures, participants had a protective factor rated as

present if they scored in the top 25% of respondents. All other individuals (i.e., who scored in the bottom 75% of participants) were rated as having parental monitoring absent. Because there were 11 risk factors and three protective factors, a youth's cumulative risk score could range from 0 – 11 and the cumulative protective factor score from 0 – 3.

First, the percentage of gang and non-gang youth that possessed a certain number of risk and protective factors were examined (Figures 4a and 4b). As shown, in Figure 4a, the effect of having multiple risk factors was more pronounced among gang-involved youth. Approximately one-third of gang youth (29.4%) had all 11 risk factors present, 20.6% had 10 risk factors present, and 29.4% had 9 present compared to 3.80%, 5.10%, and 17.90% of non-gang youth, respectively. As shown in Figure 4b, more than half (55.88%) of gang youth had no protective factors present, 20.58% had one protective factor, 20.58% had two protective factors, and 0% had all three protective factors present, compared 24.35%, 39.74%, 23.07%, and 12.82% of non-gang youth, respectively.



**Figure 4. Frequencies of (A) Cumulative Risk Factors and (B) Cumulative Protective Factors for Gang and Non-Gang Youth**

Whether there was a threshold at which the likelihood of gang involvement increased with risk factors and decreased with protective factors was examined using odds ratios. As shown, in Table 17 there was a significant increase in the odds ratios between eight and nine risk factors. Youth possessing eight risk factors were 29% *less* likely to join a gang, however once that number rose to nine risk factors, youth were 15% more likely to join a gang. There was also another substantial increase in the odds ratio for gang membership, occurring between nine and 10 risk factors, and 10 and 11 risk factors. Youth who had 10 risk factors present were 404% more likely to join a gang, whereas youth with all 11 risk factors were 774% more likely to join a gang. Thus, it appears that a youth needs to experience at least nine risk factors for there to be an impact on whether they join a gang.

**Table 17. Odds Ratios for Gang Membership by Number of Risk Factors**

Number of Risk Factors	Odds Ratio †
1	1.00
2	0.95
3	0.97
4	0.56
5	0.92
6	0.86
7	0.28
8	0.71
9	1.15
10	4.04
11	7.74

*Note.* † To calculate the odds ratio when the number of gang or non-gang youth with each risk factor was equal to zero .05 was added to each cell (see Deeks & Higgins, 2010; Pagano & Gauvreau, 2000).

As shown, in Table 18 youth who had zero protective factors present were 229% more likely to join a gang. However, there was a significant decrease in the odds ratio between zero and one protective factors. Youth who had one protective factor present were 49% *less* likely to join a gang. However, when two or three protective

factors were present, youth were only 11% and 21% less likely to joining a gang, respectively. Thus it would seem that although having multiple protective factors reduces the likelihood of gang involvement, only one protective may be needed to reduce the likelihood that a youth will join a gang.

**Table 18. Odds Ratios for Gang Membership by Number of Protective Factors**

Number of Protective Factors	Odds Ratio <sup>†</sup>
3	0.79
2	0.89
1	0.52
0	2.29

*Note.* <sup>†</sup> To calculate the odds ratio when the number of gang or non-gang youth with each protective factor was equal to zero .05 was added to each cell (see Deeks & Higgins, 2010; Pagano & Gauvreau, 2000).

### **Research Question 3: What is the effect of gang involvement on the time and frequency of offending, controlling for the effects of the risk and protective factors associated with gang membership?**

Mann-Whitney U tests and negative binomial regression analyses were used to examine whether gang youth and non-gang youth significantly differed in the number of total, violent, and non-violent offences at 3-month, 12-month, and in the case of official records, average 4-year follow-ups. In addition, Cox regression analyses were conducted to determine whether gang and non-gang youth differed in time to failure (i.e., first charge or conviction) over the average 4-year follow-up period. The difference between the total number of self-reported and official criminal offences was significant for both periods (3-month:  $U = 475, p = .00, r = .46$ ; 12-month:  $U = 867, p = .01, r = .24$ ), thus self-report and official data were examined separately in each of the subsequent analyses. Self-reported and official offences did not significantly differ as a function of when the youth was gang-involved or (i.e., in the past or both in the past and currently) or how the youth was identified as a gang member (i.e., self-report or both self-report

and official records) at the 3-month, 12-month or average 4-year periods, therefore these groups were collapsed for analysis.

As illustrated in Table 19, Mann-Whitney U tests indicated that at both 3- and 12-month follow-ups, gang-involved youth self-reported more total and violent offences compared to non-gang youth. Although non-violent offences did not differ between the two groups at the 3-month follow-up, at the 12-month follow-up gang youth self-reported more non-violent offences compared to non-gang youth. When official data was considered (see Table 20), groups did not significantly differ with respect to the number of total, violent, or non-violent offences committed at any point over the average 4-year follow-up period suggesting that self-report data may be a more accurate indication of the nature and severity of offending committed by gang youth over the follow-up period.

**Table 19. Self-Reported Offending as a Function of Gang Status**

	Non-Gang Youth Mdn (Range)/	Gang Youth Mdn (Range)	<i>U, p, r</i>
<b>3-Month FU<sup>†</sup></b>			
Any	1 (0 - 37)	4 (0 - 33)	<i>U</i> = 483.50, <i>p</i> = .01, <i>r</i> = .27
Violent	0 (0 - 13)	2 (0 - 13)	<i>U</i> = 447.50, <i>p</i> = .003, <i>r</i> = .33
Non-Violent	1 (0 - 24)	2 (0 - 20)	<i>U</i> = 558.00, <i>p</i> = .07, <i>r</i> = .19
<b>12-Month FU<sup>††</sup></b>			
Any	0 (0 - 14)	6 (0 - 31)	<i>U</i> = 176.50, <i>p</i> = .001, <i>r</i> = .44
Violent	0 (0 - 8)	2 (0 - 18)	<i>U</i> = 191.00, <i>p</i> = .00, <i>r</i> = .45
Non-Violent	0 (0 - 8)	4 (0 - 16)	<i>U</i> = 178.50, <i>p</i> = .07, <i>r</i> = .44

Note: FU = Follow-up. Mdn = Median.

<sup>†</sup>Total *n* at 3-month follow-up = 85 (18 non-gang youth and 9 gang youth did not complete the 3-month follow-up).

<sup>††</sup>Total *n* at 12-month follow-up = 63 (31 non-gang youth and 17 gang youth did not complete the 12-month follow-up).

As the above analyses established some differences between gang and non-gang youth at the bivariate level, negative binomial regression analyses were conducted to see if gang membership predicted offending, controlling for the effects of cumulative risk factors and cumulative protective factors associated with gang involvement, and

total time spent in custody over the follow-up period. Prior to conducting these analyses, self-reported and official offences were examined using the Lagrange Multiplier test to determine if overdispersion (i.e., the variance was greater than the mean) was present in the data and thus making negative binomial regression more appropriate for the data than Poisson regression (which is used for skewed count data when the variance is equal to the mean). Lagrange Multiplier showed that negative binomial regression was appropriate for all dependent variables. In addition, correlations between gang involvement, days in custody, and cumulative risk were examined to determine whether there would be any problems with collinearity. Although there were significant correlations between gang involvement and cumulative risk ( $r = 0.43$ ,  $p = .000$ ), and gang involvement, and days in custody at 3-month follow-up ( $r = 0.27$ ,  $p = .02$ ), correlations were in the small to moderate range indicating that collinearity was not an issue

**Table 20. Official Offending as a Function of Gang Status**

	<b>Non-Gang Youth Mdn (Range)</b>	<b>Gang Youth Mdn (Range)</b>	<b><i>U, p, r</i></b>
<b>3-Month FU<sup>†</sup></b>			
Any	0 (0 - 11)	0 (0 - 8)	<i>U</i> = 1065.00, <i>p</i> = .41, <i>r</i> = .08
Violent	0 (0 - 6)	0 (0 - 8)	<i>U</i> = 1130.00, <i>p</i> = .71, <i>r</i> = .04
Non-Violent	0 (0 - 7)	0 (0 - 8)	<i>U</i> = 1061.00, <i>p</i> = .38, <i>r</i> = .08
<b>12-Month FU<sup>†</sup></b>			
Any	2.5 (1 - 5)	2 (1 - 5)	<i>U</i> = 1092.00, <i>p</i> = .11, <i>r</i> = .15
Violent	0 (0 - 2)	0 (0 - 3)	<i>U</i> = 1096.50, <i>p</i> = .12, <i>r</i> = .14
Non-Violent	1.5 (1 - 4)	1.5 (1 - 2)	<i>U</i> = 1087.50, <i>p</i> = .11, <i>r</i> = .15
<b>Avg. 4-Year FU<sup>†</sup></b>			
Any	3.5 (0 - 12)	5 (0 - 16)	<i>U</i> = 1202.00, <i>p</i> = .48, <i>r</i> = .07
Violent	0.5 (0 - 10)	0.5 (0 - 4)	<i>U</i> = 1084.50, <i>p</i> = .65, <i>r</i> = .04
Non-Violent	0 (0 - 17)	4 (0 - 12)	<i>U</i> = 1043.50, <i>p</i> = .67, <i>r</i> = .04
<b>Any Offending FU</b>			
Any	2 (0 - 95)	2 (0 - 46)	<i>U</i> = 1252.00, <i>p</i> = .71, <i>r</i> = .04
Violent	0 (0 - 37)	0 (0 - 18)	<i>U</i> = 4216.00, <i>p</i> = .49, <i>r</i> = .07
Non-Violent	1 (0 - 58)	1 (0 - 28)	<i>U</i> = 1295.00, <i>p</i> = .30, <i>r</i> = .01

Note: FU = Follow-up. Mdn = Median.

<sup>†</sup> Total *N* at 3 month, 12 month and average 4 year follow-up = 107 (four non-gang youth and one gang youth had missing data).

With respect to self-reported offences at the 3-month follow-up (see Table 21), the overall model for non-violent offences was not significant. Neither gang status nor any of the control variables were significantly related to self-reported non-violent offences. However, there was a significant and positive effect of gang membership on total and violent offences at the 3-month follow-up. The incident rate for gang youth was 2.24 and 2.11 times the incident rate for non-gang youth, respectively, holding other variables constant. With respect to self-reported offences at the 12-month follow-up, there was a significant and positive effect of gang membership on self-reported total,

violent, and non-violent offences. The incident rate for gang youth was 4.30, 5.77, and 3.72 times the incident rate for non-gang youth, respectively. In addition, days in custody was a significant predictor of non-violent offences at the 12-month follow-up. For every one unit increase in the time spent in custody over the 12-month follow-up the incident rate of a self-reported non-violent offence increased by 3%.

With respect to official offences at the 3-month follow-up (see Table 22), days in custody was the only significant predictor of total offences; however, both gang status and days in custody had significant and positive effects on non-violent offences controlling for other variables in the model. The incident rate for gang youth was 6.42 times that of non-gang youth. Further, for each additional day spent in custody, the incident rate increased by 4% for any offence and 13% for a non-violent offence. In addition, cumulative protective factors had significant and negative effects on non-violent offences. For each one unit increase in cumulative protective factors the incident rate decreased by 6.2%. At the 12-month follow-up, neither gang status nor the control variables were significantly related to violent, non-violent, or total offences. At the average four-year follow-up, days in custody was the only significant predictor of violent, non-violent and total offences. For each day in custody, there was a 6.5%, 5.5%, and 5.8% increase in the incident rate of charges or convictions for a violent, non-violent or any offence, respectively.<sup>13</sup> With respect to offending committed at any point over the average 4-year follow-up period, gang membership and cumulative risk were significantly associated with violent offending (see Table 23). The incident rate for gang youth was 1.68 times that of non-gang youth, controlling for other variables in the model. Further values indicated that a one unit increase in the number of risk factors would yield a 13% increase in the incident rate of charges or convictions for a violent offence. With respect to any offences, days in custody and score on the cumulative risk index were the only significant predictors. For every one unit increase in score on the cumulative risk index, there was 23% increase in the incident rate for any offence and a 23% increase in the incident rate for a non-violent offence. In addition, for each day in custody, there was a 3% increase in the incident rate of any offence. With regards to non-violent offences, cumulative risk was the only significant predictor; for every one unit increase in score on the cumulative risk index there was a 23% increase in the incident rate.

Cox regression survival analysis was conducted to determine whether gang members recidivated faster than non-gang members for any offence, a violent offence, or a non-violent offence over the average 4-year follow-up period. Overall, the median survival time was 1,144 days for a violent offence, 595 days for a non-violent offence, and 326 days for any (i.e., violent or non-violent) offence. Gang youth had a median survival time of 972 days for a violent offence, 595 days for a non-violent offence, and 237 days for any offence. Non-gang youth had a median survival time of 1268 days for a violent offence, 739 days for a non-violent offence, and 739 days for any offence. Cox regression was used to determine if these differences were significant controlling for the effects of days in custody and scores on cumulative risk and protective indices (see Table 24). Results indicated that, contrary to the hypothesis, being part of gang did not significantly increase the imminence of any, violent, or non-violent offending once cumulative risk and protective factors and days in custody were controlled (see Figure 5). In the violence model, cumulative risk was significantly related to time to failure. Positive values indicate that for every one unit increase in risk factors, the time to violence decreased by 36%. In addition, days in custody was a significant covariate of any violent offence; for every one unit increase in days in custody, the time to violence decreased by 3%. With regards to any offence, cumulative risk was the only significant predictor, with a one unit increase in cumulative risk factor score leading to a 37% decrease in the amount of time to re-offence.<sup>14</sup>

<sup>14</sup> Negative binomial and Cox regression analyses were also re-estimated with dichotomous indicators of cumulative risk (i.e., 0 = no risk factors, 1 = one or more risk factors) and cumulative protective factors (i.e., 0 = no protective factors, 1 = one or more protective factors) entered into the model. Results did not vary a function of whether cumulative risk or cumulative protective indices were entered as continuous or dichotomous predictors in the model.

**Table 21. Negative Binomial Regression Model for Self-Reported Offending at 3 and 12 Months**

	Any Offence				Violent Offence				Non-Violent Offence			
<b>3-Month Follow-Up</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>
Days Custody	0.01 (0.01)	1.01	0.98 - 1.03	.49	0.01 (0.05)	1.01	0.98 - 1.04	.50	-0.00 (0.01)	0.99	0.97 - 1.03	.86
Risk Index	0.06 (0.07)	1.06	0.91 - 1.23	.44	0.13 (0.08)	1.14	0.97 - 1.35	.12	0.08 (0.07)	1.09	0.94 - 1.26	.27
Protective Index	0.30 (0.16)	1.35	0.99 - 1.83	.06	0.23 (0.19)	1.27	0.88 - 1.88	.20	0.25 (0.17)	1.29	0.93 - 1.79	.13
Gang Member †	0.81 (0.34)	2.24	1.15 - 4.34	.02	0.97 (0.35)	2.62	1.32 - 5.23	.006	0.69 (0.34)	1.99	1.03 - 3.88	.04
Model Fit	$\chi^2(4) = 12.43, p = .01$				$\chi^2(4) = 15.43, p = .004$				$\chi^2(4) = 8.04, p = .09$			
<b>12-Month Follow-Up</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>
Days Custody	0.02 (0.01)	1.03	1.00 - 1.05	.06	0.02 (0.01)	1.02	0.99 - 1.05	.24	0.03 (0.01)	1.03	1.00 - 1.06	.02
Risk Index	-0.02 (0.09)	0.98	0.82 - 1.12	.81	-0.01(0.10)	0.98	0.81 - 1.20	.90	-0.05 (0.10)	0.95	0.78 - 1.16	.64
Protective Index	-0.18 (0.18)	0.84	0.58 - 1.21	.34	0.02 (0.01)	1.02	0.99 - 1.05	.93	-0.35 (0.21)	0.71	0.47 - 1.06	.10
Gang Member †	1.46 (0.36)	4.30	2.13 - 8.11	.00	1.75 (0.41)	5.77	2.61 - 8.75	.001	1.32 (0.39)	3.72	1.73 - 8.02	.001
Model Fit	$\chi^2(4) = 30.72, p = .000$				$\chi^2(4) = 26.53, p = .000$				$\chi^2(4) = 27.13, p = .000$			

Note. Risk Index = Cumulative Risk Index. Protective Index = Cumulative Protective Index. SE = Standard Error. CI = Confidence Intervals. † Non-gang involved youth are the reference category.

**Table 22. Negative Binomial Regression Model for Official Offences at 3 Months, 12 Months, and Average 4-Year Periods**

	Any Offence				Violent Offence				Non-Violent Offence			
<b>3-Month Follow-Up</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>
Days Custody	0.04 (0.02)	1.05	1.01 - 1.08	.01	0.01 (0.01)	1.01	0.97 - 1.06	.63	0.07 (0.02)	1.13	1.04 - 1.13	.00
Risk Index	0.04 (0.07)	1.04	0.90 - 1.20	.62	0.25 (0.34)	1.28	0.66 - 2.49	.46	0.12 (0.10)	1.08	0.93 - 1.38	.51
Protective Index	-0.28 (0.17)	0.75	0.54 - 1.05	.10	0.00 (0.00)	1.00	0.77 - 1.30	.98	-0.94 (0.24)	0.94	0.24 - 1.07	.06
Gang Member †	- 0.02 (0.66)	0.54	0.24 - 1.23	.15	1.45 (0.34)	4.20	1.18 - 14.96	.03	1.86 (0.56)	6.42	1.50 - 6.81	.00
Model Fit	$\chi^2(4) = 11.85, p = .02$				$\chi^2(4) = 6.93, p = .14$				$\chi^2(4) = 36.62, p = .00$			
<b>12-Month Follow-Up</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>
Days Custody	0.01 (0.01)	1.01	0.98 - 1.04	.45	-0.01(0.04)	0.46	0.21 - 1.04	.06	0.00 (0.00)	1.00	0.98 - 1.03	.08
Risk Index	-0.27 (0.17)	0.76	0.55 - 1.06	.11	-0.76(0.40)	0.99	0.91 - 1.07	.11	0.00 (0.00)	0.78	0.53 - 1.15	.21
Protective Index	-0.32 (0.46)	0.73	0.30 - 1.78	.49	-0.27(0.65)	0.67	0.03 - 1.73	.10	-0.25(0.19)	1.03	0.36 - 2.95	.96
Gang Member †	0.06 (0.44)	1.06	0.46 - 2.51	.89	3.08 (1.07)	1.08	0.89 - 6.19	.07	-0.57 (0.51)	0.57	0.01 - 1.56	.27
Model Fit	$\chi^2(4) = 3.10, p = .54$				$\chi^2(4) = 8.79, p = .06$				$\chi^2(4) = 4.98, p = .55$			
<b>4-Year Follow-Up</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>	<b>b (SE)</b>	<b>Exp (b)</b>	<b>95% CI</b>	<b>p</b>
Days Custody	-0.06 (0.01)	1.06	1.03 - 1.08	.00	0.06 (0.01)	1.07	1.04 - 1.09	.00	0.05 (0.12)	1.06	1.03 - 1.08	.00
Risk Index	-0.12 (0.08)	0.89	0.76 - 1.40	.13	-0.09(0.11)	0.92	0.73 -1.15	.46	-0.13 (0.08)	0.88	0.75 - 1.03	.11
Protective Index	-0.19 (0.18)	0.83	0.58 - 1.19	.31	0.00(0.25)	1.00	0.62 - 1.64	.98	0.00 (0.25)	1.00	0.62 - 1.64	.98
Gang Member †	-0.42 (0.42)	0.69	0.29 - 1.51	.33	-0.08(0.56)	0.93	0.31 - 2.85	.89	-0.45 (0.43)	0.64	0.28 - 1.48	.29
Model Fit	$\chi^2(4) = 39.42, p = .00$				$\chi^2(4) = 40.49, p = .00$				$\chi^2(4) = 33.61, p = .00$			

Note. Risk Index = Cumulative Risk Index. Protective Index = Cumulative Protective Index. SE = Standard Error. CI = Confidence Intervals. † Non-gang involved youth are the reference category.

**Table 23. Negative Binomial Regression Model for Total Number of Official Offences over Average 4-Year Follow-Up Period**

	Any Offence				Violent Offence				Non-Violent Offence			
	b(SE)	Exp (b)	95% CI	p	b(SE)	Exp (b)	95% CI	p	b(SE)	Exp (b)	95% CI	p
Days Custody	0.03 (0.05)	1.03	1.01 - 1.05	.00	0.00 (0.00)	1.02	0.95 - 2.97	.10	0.00 (0.00)	1.00	1.00 - 1.00	.10
Risk Index	0.21 (0.06)	1.23	1.10 - 1.38	.00	0.13 (0.07)	1.13	1.09 - 1.29	.00	0.24 (0.06)	1.23	1.04 - 1.15	.00
Protective Index	-0.00 (0.00)	0.99	0.97 - 1.00	.68	0.00 (0.00)	0.78	0.99 - 1.00	.78	-0.00 (0.00)	0.99	0.99 - 1.00	.56
Gang Member †	0.00 (0.43)	0.70	0.30 - 1.64	.71	0.52 (0.29)	1.68	1.16 - 1.89	.03	-0.11 (0.27)	0.89	0.50 - 1.67	.69
Model Fit	$\chi^2(4) = 68.35, p = .00$				$\chi^2(4) = 53.78, p = .00$				$\chi^2(4) = 64.39, p = .00$			

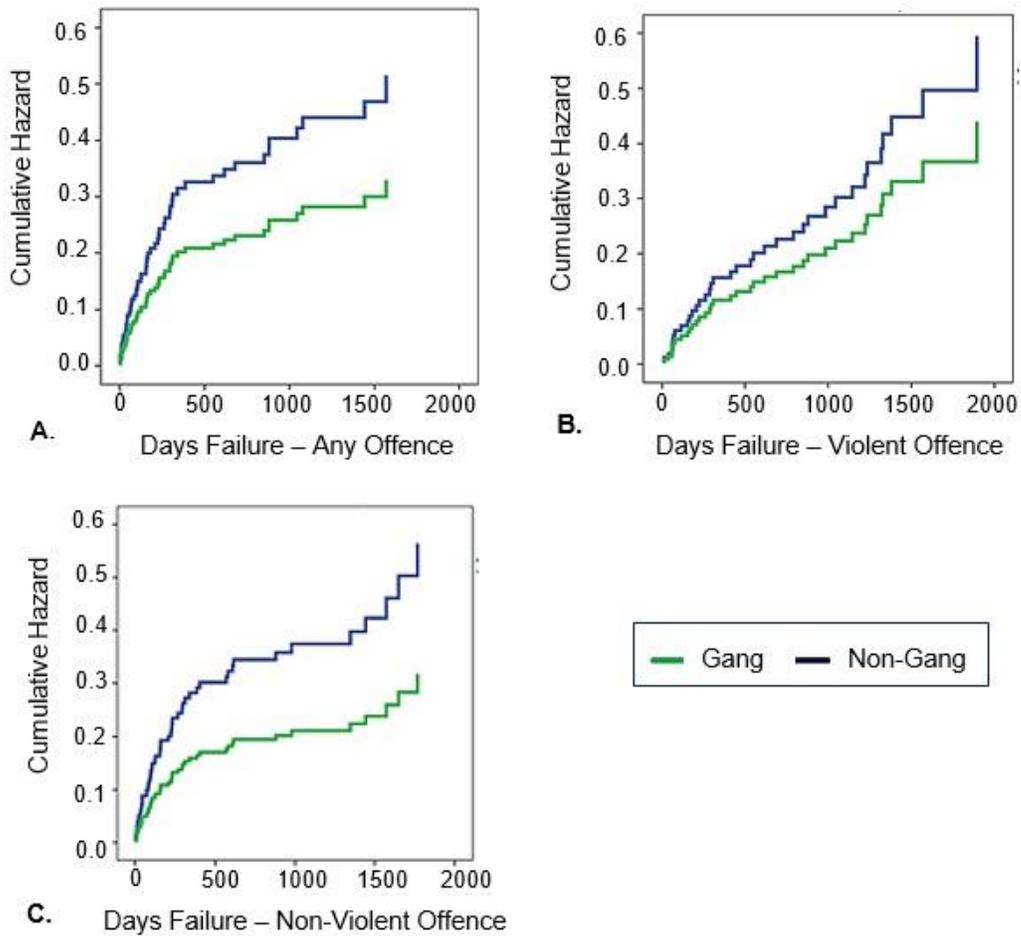
Note. Risk Index = Cumulative Risk Index. Protective Index = Cumulative Protective Index. SE = Standard Error. CI = Confidence Intervals. † Non-gang involved youth are the reference category.

**Table 24. Cox Regression Analysis Predicting Time to First Offence over Average 4-Year Follow-Up Period**

	Any Offence				Violent Offence				Non-Violent Offence			
	b (SE)	Exp (b)	95% CI	p	b (SE)	Exp (b)	95% CI	p	b (SE)	Exp (b)	95% CI	p
Days Custody	0.00 (0.00)	1.00	0.99 - 1.00	.71	0.03 (0.05)	1.03	1.01 - 1.06	0.00	0.00 (0.00)	1.00	0.99 - 1.00	.62
Risk Index	0.31 (0.08)	1.37	1.18 - 1.58	.00	0.31 (0.11)	1.36	1.11 - 1.68	0.00	0.31 (0.08)	1.36	1.17 - 1.59	.00
Protective Index	0.00 (0.00)	1.00	0.99 - 1.00	.56	0.00 (0.00)	1.00	0.99 - 1.00	0.25	0.00 (0.00)	1.00	1.00 - 1.00	.62
Gang Member †	0.45 (0.32)	1.56	0.83 - 2.94	.17	0.30 (0.41)	1.35	0.61 - 3.00	0.46	0.57 (0.33)	1.76	0.93 - 3.39	.18
Model Fit	-2LL = 483.08, $\chi^2(4) = 19.30, p = .001^1$				-2LL = 289.77, $\chi^2(4) = 38.45, p = .00^2$				-2LL = 464.51, $\chi^2(4) = 18., p = .39^3$			

Note. Statics displayed are for the final model. SE = Standard Error. CI = Confidence Intervals. † Non-gang involved youth are the reference category

<sup>1</sup>  $\Delta$  Model  $\chi^2(1) = 1.95, p = .16$ ; <sup>2</sup>  $\Delta$  Model  $\chi^2(1) = 3.13, p = .08$ ; <sup>3</sup>  $\Delta$  Model  $\chi^2(1) = 0.56, p = .47$

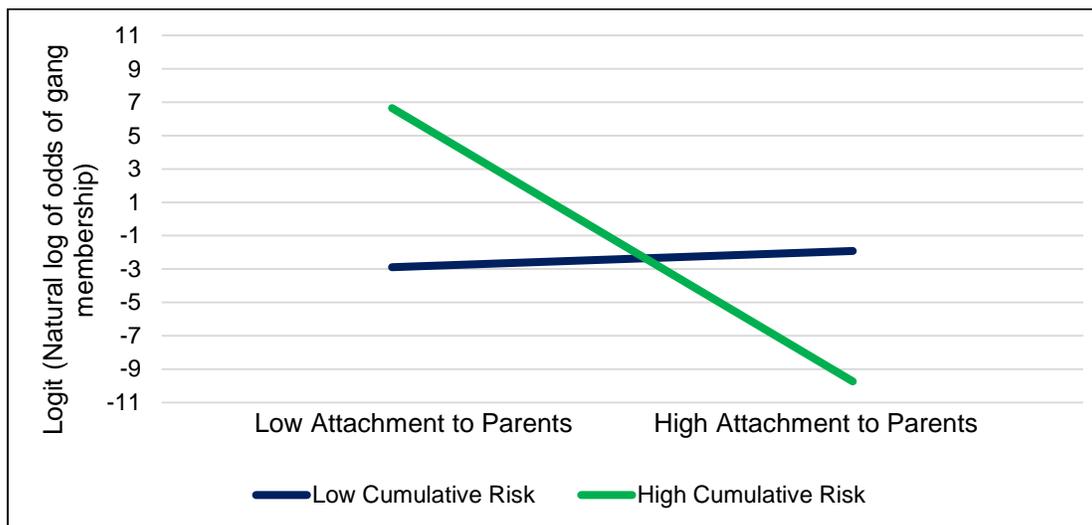


**Figure 5. Hazard Function Plot for Gang Status against (A) Any Offences, (B) Violent Offences, and (C) Non-Violent Offences**

*Note.* Figure 5 indicates that the assumption of proportionality of hazards has been met as no lines intersect.

## **Research Question 4: Do protective factors moderate or mediate the relationship between risk factors and gang involvement?**

In Research Question 1, three protective factors were found to have direct protective (i.e., negative) effects on gang involvement: strong attachment and bonds, a resilient personality, and parental monitoring. However, protective factors may also have indirect effects on youth gang involvement (e.g., moderate or mediate the effects of risk factors). Whether any of the protective factors included in the study moderated or mediated the effects of risk factors on gang involvement were examined using a series of logistic analyses with gang involvement (present/absent) as the outcome. The Cumulative Protective Index was also included in these analyses as an additional test of whether an accumulation of protective factors had indirect effects on multiple sources of risk. In total, 20 moderation and 20 mediation analyses (cumulative risk index by 20 potential protective factors and scales) were conducted. To counter the problem of these multiple comparisons generating significance by chance, Bonferroni adjustment was applied to the  $p$  values for each interaction. No significant mediation effects of any of the variables were observed at  $p < .05$ . However, of the 20 moderation analyses conducted, one interaction term was statistically significant at  $p < .05$ . Although this interaction term did not remain significant after Bonferroni adjustment (i.e.,  $.05/20 = p < .0025$ ), due to the largely exploratory nature of the analyses, the results of this analysis are described below. To determine the direction of the interaction, unstandardized regression coefficients were plotted using the following equation: [Logit ( $y$ ) = constant  $\beta$  + risk factor  $\beta$  + protective factor  $\beta$  + interaction  $\beta$ ]. To reflect the effect of the risk factor on gang joining in the presence or absence of the protective factor, -2 to was chosen to represent “low” and +2 to represent “high” for each of the variables. The following predicted logits were produced and graphed in Figure 6.



**Figure 6. Effect of Attachment to Parents on Gang Membership by Level of Cumulative Risk**

Attachment to Parents significantly moderated the relationship between scores on the Cumulative Risk Index and gang involvement (see Figure 6),  $\text{Exp}(b) = 0.32$ ,  $\text{CI} [0.15 - 0.68]$ ,  $\text{Wald } \chi^2(1) = 8.99$ ,  $p = .003$ ;  $\text{Model } \chi^2(3) = 36.10$ ,  $p = .000$ ;  $\Delta \text{Model } \chi^2(1) = 10.08$ ,  $p = .002$ <sup>15</sup>. When scores on the Cumulative Risk Index were low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function of attachment to parents. In contrast, when scores on the Cumulative Risk Index were high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with high attachment to parents (i.e., two standard deviations above the mean of attachment to parents).

### **Research Question 5: Do protective factors moderate or mediate the relationship between psychopathy and gang involvement?**

To examine research question 5, logistic regression analyses were conducted to examine whether protective factors moderated or mediated the relationship between

<sup>15</sup> Change from main effects only model.

psychopathy and gang involvement.<sup>16</sup> For the PCL:YV, there was strong evidence of an overall difference between gang and non-gang youth on total and factor scores. Although there were no significant differences between the two groups on the affective factor, gang youth scored significantly higher on the PCL:YV total score, as well as the interpersonal, affective and antisocial factors (see Table 25), thus youth with traits of psychopathic personality disorder appeared more likely to be gang members compared to their non-gang involved peers.

**Table 25. PCL:YV Total and Factor Scores as a Function of Gang Status**

Scale	Non-Gang Youth ( <i>n</i> = 78)	Gang-Youth ( <i>n</i> = 34)	<i>t</i> ( <i>df</i> ), <i>p</i> , Cohen's <i>d</i>
Total	14.34 (6.84)	20.29 (7.64)	<i>t</i> (110) = 4.08, <i>p</i> = .00, <i>d</i> = 0.82
Factor 1	1.72 (1.87)	2.82 (1.96)	<i>t</i> (110) = 2.83, <i>p</i> = .005, <i>d</i> = 0.57
Factor 2	2.82 (1.72)	3.26 (2.15)	<i>t</i> (110) = 1.17, <i>p</i> = .27, <i>d</i> = 0.23
Factor 3	4.07 (2.15)	5.67 (2.31)	<i>t</i> (110) = 3.54, <i>p</i> = .001, <i>d</i> = 0.72
Factor 4	5.16 (2.37)	6.9 (2.56)	<i>t</i> (110) = 3.49, <i>p</i> = .001, <i>d</i> = 0.71

*Note.* Mean (Standard Deviation). *df* = Degrees of Freedom.

Next, because of the relationship between psychopathy and gang involvement, moderation and mediation analyses were conducted to determine whether protective factors increased, decreased, or had no effect on the likelihood of gang involvement in youth with psychopathic personality traits. In total 100 moderation and 100 mediation analyses (5 PCL:YV total and subscales by 20 potential protective factors and scales) were conducted. No significant mediation effects of any of the variables were observed at *p* < .05. Of the 100 moderation analyses conducted, five interaction terms were statistically significant at *p* < .05 (see Table 26). For three of the five significant interactions, high levels of the protective factor increased the likelihood of gang

<sup>16</sup> Scores on the Cumulative Risk Index had large associations with PCL: YV Total (*r* = .58, *p* = .00), Factor 3 (*r* = .59, *p* = .000), and Factor 4 scores (*r* = .64, *p* = .00). Although this suggests that the current analyses may yield similar findings to those obtained in Research Question 4, given that these variables possessed some independent variance (i.e., none of the correlations exceeded .70) whether protective factors moderated the relationship between the PCL:YV and gang involvement was examined.

involvement, whereas for the other two significant interactions high levels of the protective factor decreased the likelihood of gang involvement. Although these interaction terms did not remain significant after Bonferroni adjustment (i.e.,  $.05/100 = p < .0005$ ), the results of these analyses are described below. Similar to Research Question 4, the direction of the interaction was determined by plotting the unstandardized regression coefficients using the equation:  $[\text{Logit } (y) = \text{constant } \beta + \text{PCL:YV score } \beta + \text{protective factor } \beta + \text{interaction } \beta]$  to reflect the effect of psychopathy on gang joining in the presence or absence of the protective factor choosing -2 to represent “low” and +2 to represent “high” for each of the variables. The following predicted logits were produced and graphed in Figures 7 through 11.

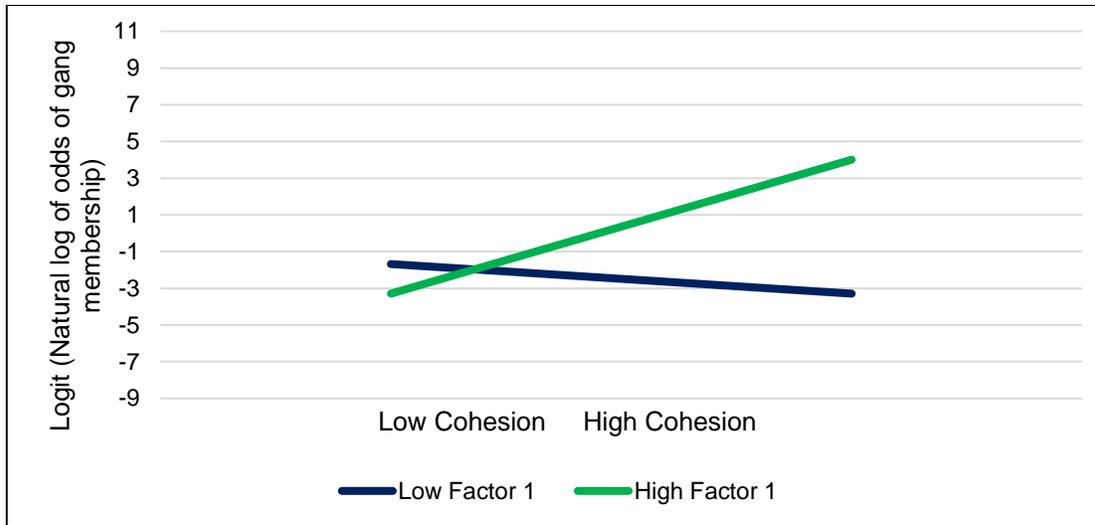
**Table 26. Overview of Tested Moderation Effects (Protective Factor by PCL:YV Score)**

Protective Factor	PCL:YV				
	Total	Factor 1	Factor 2	Factor 3	Factor 4
<b>SAVRY Protective</b>					
Total	--	--	--	--	--
P1	--	--	--	--	--
P2	--	--	--	--	--
P3	--	--	--	--	Yes <sup>†</sup>
P4	--	--	--	--	--
P5	--	--	--	--	--
P6	--	--	--	--	--
<b>DAP</b>					
Social Competencies					
Positive Identity	--	--	--	--	--
Positive Values	--	--	--	--	--
Empowerment	--	--	--	--	--
Commitment to Learning	--	--	--	--	--
Constructive Use of Time	--	--	--	--	--
School Expectations	--	--	--	Yes <sup>††</sup>	--
Neighbourhood Cohesion	--	Yes <sup>††</sup>	--	--	--
<b>SSDP</b>					
Parental Supervision	--	Yes <sup>††</sup>	--	--	--
Attachment to Parents	--	--	--	--	Yes <sup>†</sup>
Presence of Caring - IPFI	--	--	-	--	--
Hollingshead's Index	--	--	--	--	--
<b>Cumulative Protective Index</b>	--	--	--	--	--

*Note.* -- indicates that the interaction term was not significant.

<sup>†</sup> Protective factor reduced the likelihood of gang involvement when psychopathic traits were high.

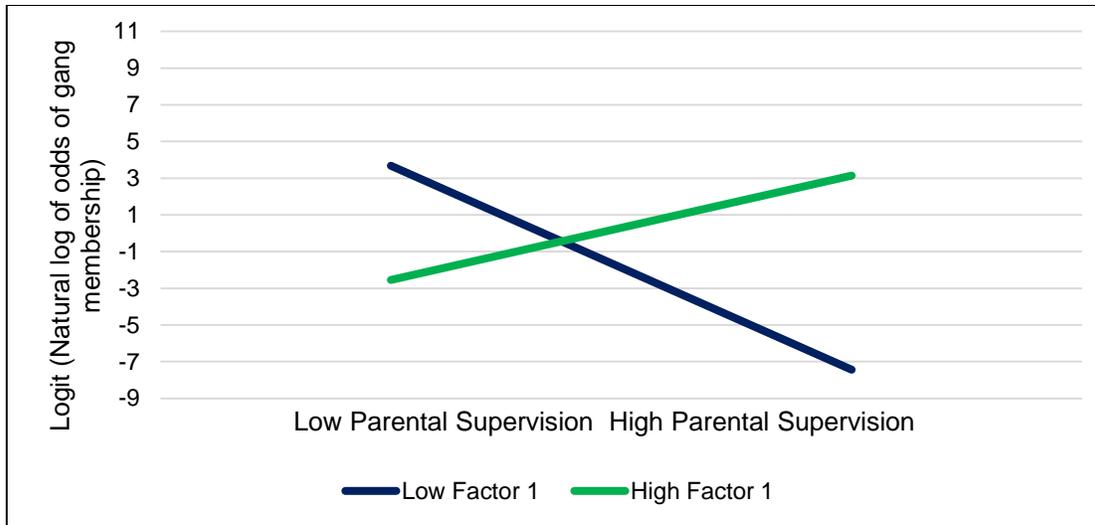
<sup>††</sup> Protective factor increased the likelihood of gang involvement when psychopathic traits were high.



**Figure 7. Effect of Neighbourhood Cohesion on Gang Membership by Level of PCL:YV Factor 1 Score**

Neighbourhood cohesion was found to significantly moderate the relationship between the interpersonal factor and gang involvement (see Figure 7),  $\text{Exp}(b) = 1.71$ ,  $\text{CI} [1.08-2.87]$ ,  $\text{Wald } \chi^2(1) = 4.10$ ,  $p = .04$ ;  $\text{Model } \chi^2(3) = 14.77$ ,  $p = .002$ ;  $\Delta \text{Model } \chi^2(1) = 4.46$ ,  $p = .04$ <sup>17</sup>. When scores on Factor 1 of the PCL:YV were low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function of neighbourhood cohesion. In contrast, when scores on Factor 1 of the PCL:YV Factor 1 were high (i.e., two standard deviations above the mean), the probability of gang involvement increased in youth with high neighbourhood cohesion (i.e., two standard deviations above the mean of neighbourhood cohesion).

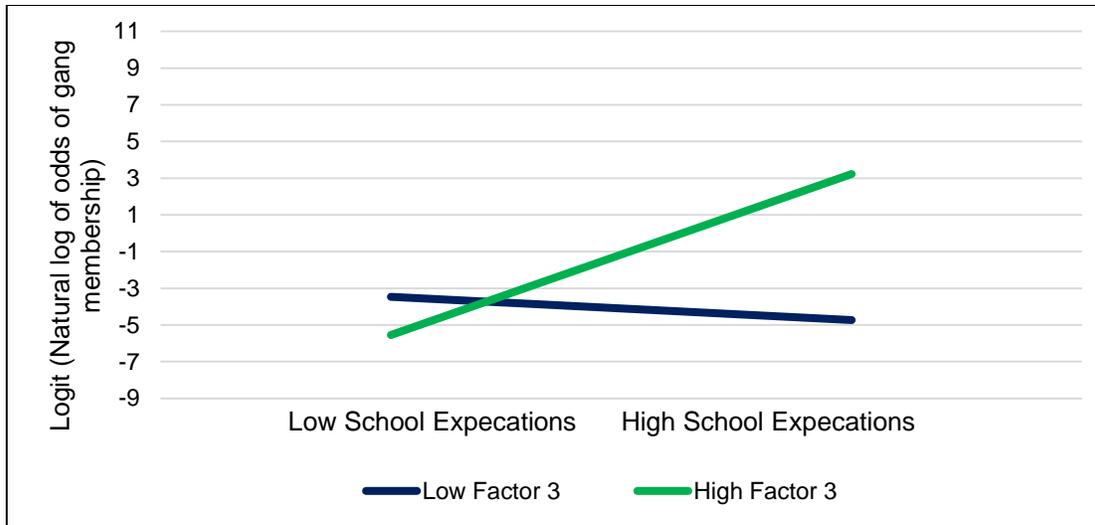
<sup>17</sup> Change from main effects only model.



**Figure 8. Effect of Parental Supervision on Gang Membership by Level of PCL:YV Factor 1 Score**

Parental supervision was found to significantly moderate the relationship between the interpersonal factor and gang involvement (see Figure 8),  $\text{Exp}(b) = 3.00$ ,  $\text{CI} [1.04-8.67]$ ,  $\text{Wald } \chi^2(1) = 4.13$ ,  $p = .04$ ;  $\text{Model } \chi^2(3) = 14.66$ ,  $p = .000$ ;  $\Delta \text{Model } \chi^2(1) = 4.50$ ,  $p = .03^{18}$ . When scores on Factor 1 of the PCL:YV were low (i.e., two standard deviations below the mean), high parental supervision (i.e., two standard deviations above the mean of parental supervision) reduced the likelihood of gang involvement. The opposite effect was observed when PCL:YV Factor 1 score was high (i.e., two standard deviations above the mean); the probability of gang involvement was aggravated in youth with high parental supervision (i.e., two standard deviations above the mean of parental supervision).

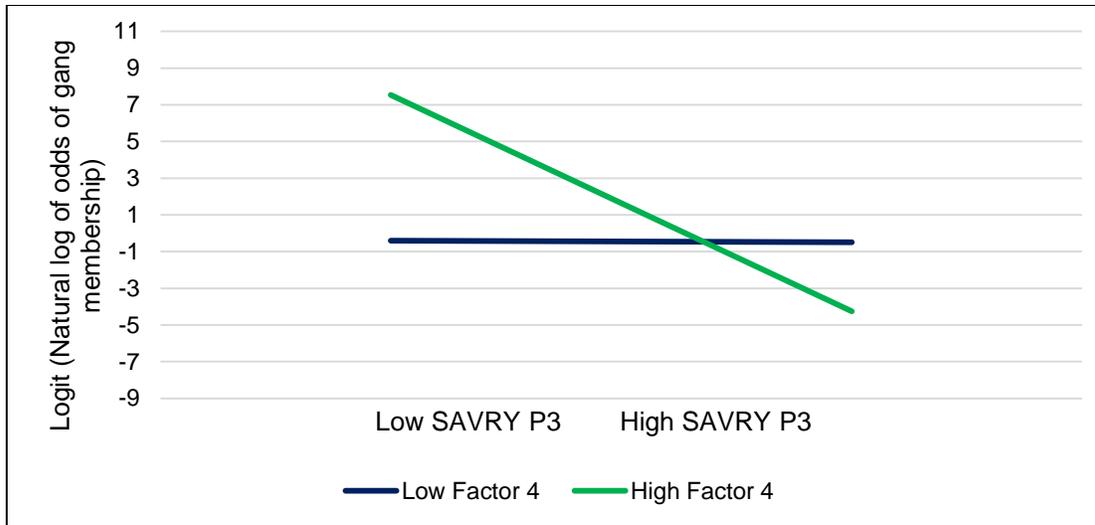
<sup>18</sup> Change from main effects only model.



**Figure 9. Effect of School Expectations on Gang Membership by Level of PCL:YV Factor 3 Score**

School expectations significantly moderated the relationship between the lifestyle factor and gang involvement (see Figure 9),  $\text{Exp}(b) = 0.56$ ,  $\text{CI} [0.33 -0.94]$ ,  $\text{Wald } \chi^2(1) = 4.83$ ,  $p = .03$ ;  $\text{Model } \chi^2(3) = 17.42$ ,  $p = .001$ ;  $\Delta \text{Model } \chi^2(1) = 5.50$ ,  $p = .02^{19}$ . When scores on Factor 3 of the PCL:YV were low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function of school expectations. In contrast, when scores on Factor 3 of the PCL:YV Factor 3 score were high (i.e., two standard deviations above the mean), the probability of gang involvement was increased in youth with high school expectations (i.e., two standard deviations above the mean of school expectations).

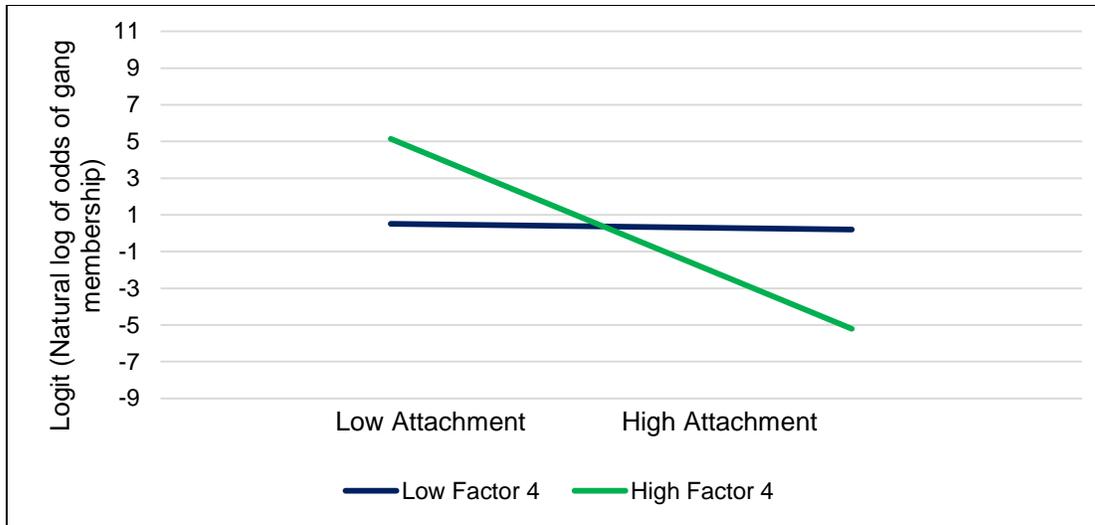
<sup>19</sup> Change from main effects only model.



**Figure 10. Effect of SAVRY P3 (Strong Attachment and Bonds) on Gang Membership by Level of PCL:YV Factor 4 Score**

P3 (Strong Attachment and Bonds) on the SAVRY was found to significantly moderate the relationship between the antisocial factor and gang involvement (see Figure 10),  $\text{Exp}(b) = 0.35$ ,  $\text{CI} [0.12 - 0.98]$ ,  $\text{Wald } \chi^2(1) = 4.05$ ,  $p = .04$ ;  $\text{Model } \chi^2(1) = 20.43$ ,  $p = .000$ ;  $\Delta \text{Model } \chi^2(1) = 16.34$ ,  $p = .000$ <sup>20</sup>. When scores on Factor 4 of the PCL:YV Factor 4 were low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function strong attachment and bonds. In contrast, when PCL:YV Factor 4 was high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with strong attachment and bonds.

<sup>20</sup> Change from main effects only model.



**Figure 11. Effect of Attachment to Parents on Gang Membership by Level of PCL:YV Factor 4 Score**

Attachment to parents was found to significantly moderate the relationship between the antisocial factor and gang involvement (see Figure 11),  $Exp(b) = 0.54$ ,  $CI [0.31 - 0.92]$ ,  $Wald \chi^2(1) = 5.04$ ,  $p = .025$ ;  $Model \chi^2(1) = 18.50$ ,  $p = .000$ ;  $\Delta Model \chi^2(1) = 5.75$ ,  $p = .02^{21}$ . When scores on Factor 4 of the PCL:YV Factor 4 were low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function attachment to parents. In contrast, when scores on Factor 4 of the PCL:YV Factor 4 were high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with high attachment to parents (i.e., two standard deviations above the mean of high attachment to parents).

<sup>21</sup> Change from main effects only model.

## Chapter 8. Discussion

### Summary

Although the relationship between gang involvement and the increased frequency of general and violent offending is well-established (e.g., Decker, 1996; Klein & Maxson, 1989; Thornberry & Burch, 1997), theories developed to explain this relationship have included a narrow range of concepts. Although some empirical studies have included a broader range of risk factors than included in existing theory, protective factors against gang involvement continue to be neglected. Most importantly, there is a need for research that simultaneously examines a broad range of both risk and protective factors, because protective factors may have indirect effects on the relationship between risk factors and gang involvement in addition to direct effects. To facilitate this line of empirical study, the main purpose of the present study was to identify risk and protective factors associated with youth gang involvement in a Canadian sample ( $n = 112$ ) of adjudicated adolescent offenders (ages 12 to 18). No instrument has been developed to examine the broad array of risk factors associated with youth gang involvement. However, given the overlap between risk factors for violence and the risk factors for gang involvement, the current study used the SAVRY as a framework from which the presence or absence of risk factors for and protective factors against youth gang involvement could be examined.

Beginning with risk factor differences, in line with previous investigations of the SAVRY in youth gang and non-gang offender samples (Chu et al., 2012), the SAVRY was able to distinguish between gang and non-gang youth in terms of both individual risk items and scale scores. In general, gang-involved youth were more verbally aggressive and impulsive, had more occasional and chronic substance use, endorsed more negative attitudes, were more often affiliated with delinquent peers, had fewer prosocial acquaintances and friends, and were more likely to reside in socially disorganized communities. In addition, gang youth were more likely to have a negative home life as

suggested by higher rates of parental criminality, a history of abuse and maltreatment by caregivers, poor relationships with parents, and early caregiver disruption. These results were consistent with previous cross-sectional and longitudinal studies of gang membership in the United States (e.g., Bjerregard & Lizotte, 1995; Kosterman et al., 1996; Maxson, Whitlock & Klein, 1998; Moore, 1991; Sanchez-Jankowski, 1991). In other words, despite the previously discussed differences between Canada and the United States (Marmot, 1998; Miller et al., 2013; Oreopoulous, 2008), theories and empirical research concerning youth gang involvement in the United States may be generalizable to youth gang members in Canada.

As existing knowledge of protective factors against youth gang involvement was limited, this research examined whether known protective factors against youth violence may also protect against gang involvement. Although the SAVRY provided a good starting point for examining protective factors against youth gang involvement, it only included a subset of protective factors against youth violence. Therefore, additional measures of protective factors were included (i.e., DAP, SSDP Parental Supervision and Attachment to Parents, Presence of Caring-IPFI, Hollingshead's Index of Social Position). With respect to individual protective factors, very few differences between gang and non-gang youth were observed on the SAVRY, DAP, and other measures of protective factors against violence. It was proposed that all types of protective factors included in the study would be inversely associated with gang involvement. However, only direct protective effects of strong attachment and bonds, parental monitoring, and resilient personality (which includes the use of positive coping strategies and social skills) were found. The lack of protective factors directly associated with youth gang involvement may be a reflection of the nature of the study participants. With a few notable exceptions, gang and non-gang youth offenders may largely look the same with regards to the presence of protective factors (or lack thereof) given the high-risk nature of the sample.

Some of the analyses concerning protective factors required further clarification as they may seem contrary to expectations, at least initially. For example, compared to non-gang youth, gang youth were found to score higher on measures of self-efficacy (i.e., Positive Identity of the DAP; e.g., "I feel good about myself", "I feel good about my future"). Although various studies have suggested that resilient youth possess low

feeling of helplessness and beliefs in self-efficacy (e.g., Werner & Smith, 2001), the relationship between offending and self-efficacy is unclear. Some studies have found enhanced self-esteem and self-efficacy in aggressive and violent youth (Baumeister, Smart, & Boden, 1996). For example, gang youth may perceive their membership in a gang as giving them a sense of purpose in life. Gang youth also scored higher on involvement in prosocial activities (i.e., Constructive Use of Time on the DAP). Although some studies have suggested that involvement in prosocial activities generally decrease antisocial outcomes (Caprara, Barbaranelli, & Pastorelli, 2001), studies of gang and non-gang youth have found that the routine activities of most gang members are not dissimilar from their non-gang peers with respect to their involvement in prosocial activities (e.g., Decker & Van Winkle, 1996; Esbsen et al, 1993). For example, Esbsen and colleagues (1993) found no differences among gang and non-gang youth with regards to school attendance, involvement in school activities, summer jobs, religious activities, and community activities.

Although it is not clear why gang youth would have higher levels of involvement in prosocial activities, one possibility is that gang-involved youth were enrolled in prosocial activities by their parents or youth probation officers as a strategy to break or reduce gang ties. However, it might also be the case that gang involvement facilitated the expansion of an offender's peer network, which could serve as a surrogate for the disrupted family experiences associated with this group. This assertion is similar to Thornberry et al.'s (1993) description of how gang involvement can facilitate or enhance offending opportunities. It is also possible that gang involvement facilitates other types of opportunities, such as a larger peer network. Although delinquent behaviour is a part of the gang lifestyle, there is more to being in a gang than just being a gang member (Taylor, Feng, Esbsen, & Petersen, 2008). In contrast, non-gang involved youth also commonly have disrupted families, but without the extended peer network, opportunities for at least some conventional activities may be limited. As an alternative explanation, individuals with an active social life and broader peer networks may be seen as 'suitable' for recruitment (e.g., Tremblay, 1993) or 'selected into' the gang (Thornberry et al., 1993), and thus through their extended peer network are more likely to be selected into a gang compared to the non-gang offender with low social competency. These latter two explanations seem plausible, and so the results of the current study reiterate the need for prospective longitudinal research that begins in early childhood and thus can identify

adolescent attributes prior to their gang involvement. Still, as such prospective longitudinal data containing a broad range of risk and protective factors related to gang involvement is not available, exploratory analysis with the current data was warranted.

A secondary question of interest in the current study was whether there was a cumulative effect of exposure to multiple risk and multiple protective factors on gang involvement and the frequency and imminence of offending. Consistent with previous studies of cumulative risk (e.g., Esbensen et al., 2009), exposure to multiple risk factors increased the risk of youth gang involvement. A critical tipping point was found at 10 and 11 risk factors, with youth at substantially increased risk to be gang-involved compared to youth with only one risk factor present. Although general support was found for the association between an accumulation of protective factors and the decreased likelihood of gang involvement, there was no substantial differences between having one protective factor compared to having two or three protective factors present. In fact, there was a greater reduction in the likelihood of gang involvement when only one protective factor was present, suggesting that additional protective factors may not exponentially decrease gang involvement. However, this finding should be interpreted with caution due to the few overall differences in protective factors between gang and non-gang youth observed in the study and that previous research generally indicates that an accumulation of protective factors has a much stronger negative effect on non-violence and non-gang involvement than a single factor (Losel & Farrington, 2012; McDaniel, 2012).

With respect to the frequency of offending, there was mixed support for the hypothesis that the relationship between gang status and frequency of offending would dissipate once cumulative risk and protective factors were accounted for. In effect, it was expected that the relationship between gang involvement and frequency of offending would be due to gang members having a greater number of risk factors and fewer protective factors rather than a direct effect of gang membership facilitating greater offending opportunities. However, based on self-report and official records of violent, non-violent, or any offending during the 3-month, 12-month, and average 4-year study periods, little support was found for this hypothesis. Scores on the cumulative protective index did not significantly predict self-reported or official offending at any of the follow-ups once gang involvement was controlled for. Although scores on the cumulative risk

index were predictive of any violent, non-violent, and total offences over the average 4-year study period, no significant effects of cumulative risk were observed at the 3-month and 12-month study periods. One explanation for non-significant findings in the two earlier follow-ups could have been related to a lack of variance in the frequency of offending across the sample within such a short time period. However, overall, gang involvement was significantly associated with self-reported violent and total offences and official records of non-violent offending at 3 months, and self-reported violent, non-violent, and total offences at 12 months suggesting that gang involvement exerted an independent influence on offending that went beyond the effects of risk and a lack of protection. This finding was consistent with Thornberry et al.'s (1993) description of enhancement, whereby delinquency was increased due to the experience of the gang itself, rather than social deficiencies that characterize its members. Lending further support to this theory, supplementary analyses (see Appendix A) found that risk factors were more strongly predictive of violent offending at the 3-month follow-up for gang youth compared to non-gang youth. Thus, although the risk factors associated with gang membership can increase the likelihood of offending, gang membership may simultaneously enhance opportunities for violence (e.g., inter-gang violence, conflicts with rival gangs) and act as motivator for violent behaviour (e.g., defend the gang's honor, induce fear, or to obtain social respect).

With the respect to the imminence of offending, however, gang involvement was not significantly associated with the incident rate of violent, or non-violent offending over the follow-up period, once scores on the cumulative risk index were considered. This is in direct contrast to research that has suggested that gang youth offend more immediately after release from custody than non-gang affiliated offenders (Chu et al., 2012). Thus, gang involvement itself may facilitate offending at a higher rate, but risk factors may play a greater role in the onset of offending. For example, when part of a gang, especially early on in an offender's entry into the group, there may be a higher expectation to engage in violent behaviour, both as a service to the gang and in order to build a valued reputation within the group (Hughes & Short, 2005; Miller & Decker, 2001). Therefore, rather than specific or cumulative risk factors, the nature of the gang itself may, at least initially, require a gang member to offend at a higher rate. For example, Descormiers' (2013) examination of incarcerated male and female youth gang members from British Columbia indicated that young gang members are often required

to commit several violent acts as part of their initiation into the gang. These youth reported that earning respect was a main motivation for their involvement in such offences. However, once reputation is earned, the need to be involved in acts of general or violent offending may be reduced. For example, higher status is associated with increased criminal connections, which can improve opportunities for offending, but can also allow leaders to take more of a 'hands off' approach, which allows them to avoid police detection (Morselli, 2009). In contrast, offenders with a multitude of risk factors may have greater difficulty avoiding police detection, which explains their continued offending long after their initial entry into the gang.

Given the current lack of agreement on the definition of a protective factor, the current research tried to address this conceptual issue by examining whether protective factors were factors that had direct, indirect, or both direct and indirect effects on gang involvement. Results indicated that some of the protective factors included in the study had direct (e.g., inverse effects) on gang involvement, whereas others had significant moderating, but not mediating, effects. Thus, it would seem that protective factors against youth gang involvement can operate either directly or indirectly. However these findings should be interpreted with caution given that these analyses were exploratory and overall very few significant interaction effects were observed. Given the number of moderation effects tested and the dichotomous rating of some of the protective items included in these analyses, it is difficult to know if some of the findings may be due to chance.

Of particular interest in this study was whether an accumulation of protective factors could moderate or mediate the effects of cumulative risk. Consistent with McDaniel's (2005) findings, scores on the cumulative protective index did not moderate or mediate the relationship between multiple sources of risk and gang involvement. However, despite a lack of cumulative buffering effects, a single protective factor, attachment to parents (as indicated by scores on the SSDP Attachment to Parents scale), significantly moderated the relationship between the effects of multiple risk factors (as indicated by scores on Cumulative Risk Index) and gang involvement in both non-psychopathic youth and youth with high scores on the antisocial facet of the PCL:YV. This finding suggests that protection in the family domain may have a greater influence on mitigating the effects of risk factors on gang involvement.

There was also evidence in the current study that the buffering effects of protective factors may have a limited effect on psychopathic youth and may even have a risk effect. Strong attachment and bonds did not moderate the relationship between risk factors and gang involvement in non-psychopathic youth. However, for youth that scored high on the antisocial facet of the PCL:YV, strong attachment and bonds decreased the likelihood of gang involvement. In terms of policy implications, this finding is quite important in identifying important protective factors for the youth most at risk of gang involvement (e.g., Dupere et al., 2007; Valdez, Kaplan, & Codina, 2000). In other words, although protective factors may not buffer risk for gang involvement in youth more generally, some protective factors (e.g., parental attachment) may be helpful for buffering the risk for those youth who are already at a higher risk of gang involvement. In contrast, although parental monitoring (e.g., “Parents know who I’m with”, “If I skipped school I would be caught by my parents”) had a direct protective effect in non-psychopathic youth, it increased the likelihood of gang involvement for youth scoring high on the interpersonal facet of psychopathy. Because of the increased autonomy associated with adolescence, parents sometimes must rely on their children to disclose their whereabouts and activities (Stattin & Kerr, 2000). Youth with interpersonal facets of psychopathy may have a specific proclivity for acting in deceitful ways, such as lying to parents about their activities as a tactic to increase and maintain freedom to associate with deviant peers and engage in antisocial behaviour (Loeber & Stouthamer-Loeber, 1986).

Some studies, however, have found that even when parents attempt to control their children this can lead to a greater likelihood of delinquency regardless of parental attachments (Wells & Rankin, 1998). This may be especially true of psychopathic youth who in general are less sensitive to parental attempts at supervision (Dupere et al., 2007). Furthermore, negative attitudes towards authority or parental supervision that is excessively restrictive, controlling, or abusive may increase the perceived attractiveness of gangs (e.g., an opportunity for freedom). However, given that the operational definition of parental monitoring used in the current study was limited to parents’ knowledge of the youth’s activities rather than active attempts to set limits or restrict behaviour, disclosure alone may be ineffective at limiting the opportunity for youth to associate with antisocial peers. Further, given that the temporal order of the variables could not be established it may be the case that youth who are gang-involved and who

have a tendency to lie and manipulate may invoke greater parental scrutiny than youth without these characteristics.

The protective factor of neighborhood cohesion (e.g., “I have good neighbours who care about me”, “I have neighbours who watch out for me”) was also found to increase the risk of gang involvement in youth with interpersonal features; however, due to the grandiose nature of individuals scoring high on interpersonal features of psychopathy, they may be more likely to brag about their neighborhood. Another protective factor, school expectations (e.g., “I have parents to urge me to do well in school”, “I have teachers who urge me to develop and achieve”) is associated with higher scores on the Lifestyle factor of the PCL:YV. One of the items on this factor, lacks realistic goals, is measured in part by youth who do not attend school yet believe in their ability to complete high school, get a university education, and attain a high paying job (e.g., Forth et al., 2003). Thus, higher school expectations may be due to having goals/expectations that are out of touch with current life circumstances. Furthermore, some parents may view education as extremely important and as a yardstick of success, which places pressure on the youth to excel in school. However, youth scoring high on the Lifestyle factor are typically irresponsible, and an increased emphasis on commitment and involvement in school may increase the likelihood that these individuals attempt to shirk responsibility. However, these findings should not be over interpreted given that many effects did not remain significant after Bonferroni correction was applied.

## **Implications**

It is important to note that the research completed as part of the current study is of an exploratory nature and more research is needed on risk and protective factors associated with youth gang involvement in Canada. However, findings may assist in the development of theory and evidence-based policy aimed at preventing the development of youth gangs and adapting appropriate gang-intervention strategies.

## Theory

Instead of using a single criminological or sociological theory (i.e., a single or a single set of risk factors) to guide the current research, the social ecological and youth positive developmental models were used in the current study. In doing so, several domains of possible risk and protective factors could be examined simultaneously, including individual, peer, family, school, and community domains. Although the literature supports the use of a multi-domain approach to examining risk and protective factors associated with youth gang involvement, not all risk and protective factors examined were associated with youth gang involvement. Risk factors were only noted in individual, family, peer, and community domains, whereas protective factors were only noted in individual and family domains. However, a lack of significant protective factors in the peer domain, may be in part due to measurement limitations of the current research. Self-report information on prosocial peer affiliation was only available for a subset of youth, therefore involvement in prosocial activities, as measured by the DAP, was used as a proxy for interactions with prosocial peers. In addition, while (P1) Prosocial Involvement on the SAVRY considers prosocial peer affiliation it also measures involvement in prosocial activities, making it difficult to isolate the effects of these two factors on gang joining.

Nonetheless, these findings suggested that some domains may have greater conceptual importance than others. The relative lack of influence of some of the domains examined may be indicative of their diminished importance relative to peers and family domains during adolescence (Esbensen et al., 2005). For example, youth may be less cognizant of community-based risk and protective factors compared to adults who may be more likely to interact with the community. It should also be considered that the importance of neighbourhood-level characteristics has been established by research in the United States (e.g., Decker & Van Winkle; 1996; Sanchez- Jankowski, 1991; Venakatesh, 1997), where the poorest neighbourhoods are substantially different from the poorest neighbourhoods in Canada (Daly, Wilson, & Vasdev, 2001), where the current research took place. Nevertheless, the use of a multi-domain approach when studying youth gangs is important because different configurations of risk and protective factors are likely to be present in different communities and different groups of individuals (see Howell & Egley, 2005). In addition, the consideration of multiple domains

will help determine if protection in one context (e.g., family) attenuates the effect of risk in another (e.g., individual; see Appendix B).

Although testing a specific criminological/sociological theory or comparing the adequacy of multiple competing theories from different disciplines was outside the scope of the current study, evidence in the current study supported the use of multiple theoretical perspectives and a multi-disciplinary approach when studying risk and protective factors associated with youth gangs. For example, consistent with social disorganization and social bond theories, gang youth were more likely than non-gang youth to come from neighborhoods characterized by community disorganization and less likely to have strong attachments to others. Further, psychological variables, such as youth psychopathy, were found to be associated with youth gang involvement. Moreover, as evidence for the need for theoretical integration, the effects of protective factors derived from sociological theories were moderated by the effects of risk factors from psychological constructs. Although this paper was based on the assumption that traditional theoretical explanations of youth gangs have been constructed based on data from the United States may have limited application to youth gangs in Canada, there is some evidence in the current study that some macro- and micro-level theories of gang involvement constructed in United States can be used to understand gang involvement in Canadian samples.

## **Prevention and Intervention Programs**

The results of the current work hold several suggestions for gang prevention and intervention efforts. Consistent with research studies in the United States (e.g., Howell & Egley, 2005), findings suggested that intervention and prevention effects should target youth exposed to multiple risk factors and address multiple aspects of the youth' life (e.g., peer, family, community). Although it is unclear which risk factors will consistently be more or less important in predicting gang membership in Canadian youth, ranking the risk factors identified in the current study by their effect sizes suggests that early caregiver disruption, exposure to violence in the home, community disorganization, and risk taking and impulsivity may be particularly important prevention and treatment targets. Findings also suggest that prevention and intervention programs for youth at risk of gang involvement should build or leverage strong attachment and bonds with

parents, parental monitoring, and a resilient personality. Given that few if any gang-specific risk and protective factors exist, programs tailored specifically to gang youth may not be required and existing programs targeted to youth violence may also be effective in reducing the likelihood of youth gang involvement.

In the current study, days in custody were found to be a significant predictor of both the frequency and onset of offending. The most obvious implication of this finding is that crime control policies may be ineffective in reducing rates of criminal involvement in gang youth. For instance, according to Sampson and Laub (2003), the effects of incarceration can lead to the removal of positive informal social controls (e.g., protective factors). However, given that high-risk offenders typically spend longer periods of time in custody and that the current analyses did not control for all risk items on the SAVRY (i.e., items that were not associated with gang involvement but increased re-offence risk) whether days in custody is causally related to subsequent offending is inconclusive. Nevertheless, policy makers should exercise caution when using suppression based strategies to reduce rates of youth gang involvement and offending.

A number of evidence-based programs that have demonstrated effectiveness in serious and violent young offenders have been developed to address the risk and protective factors identified in the current study. For example, with regards to some individual-level risk and protective factors identified, certain types of interventions have been found to foster and build resilient personality traits in youth and improve self-control. Dialectical Behaviour Therapy teaches skills in regulating emotions and tolerating distressing experiences (Linehan, 1993; MacPherson et al., 2013). Problem-solving skills training, a form of cognitive behavioural therapy, teaches adolescents to solve problems by systematically considering options, and weighing the costs and benefits of these options (Kazdin, 2010). With regards to family risk and protective factors, family based interventions, such as Functional Family Therapy (Sexton & Turner, 2010), attachment based parenting programs (E.g., Attachment-Based Family Therapy, Connect, Diamond, 2013; Moretti & Obsuth, 2009), and Multisystemic Therapy (Henggeler et al., 2009) have proven utility in improving caregiver and youth communication, parenting skills, and family relationship quality. One advantage of Multisystemic Therapy is that, while the family is the primary area of work, it also addresses risk and protective factors in multiple other systems that youth are involved in

(e.g., peer, school, and community) and thus may be particularly useful in providing comprehensive, multi-faceted approach when working with gang-involved and at-risk youth. With regards to community level risk factors, suppression techniques to reduce crime and gang activity in neighborhoods may be effective.

The risk and protective factors for and against youth gang involvement identified in the current study provide a starting point for developing intervention and prevention programs targeted to youth gangs. However, these findings should be interpreted with the following caveats. First, some of the risk and protective factors found to be associated with gang involvement in the current study (e.g., early caregiver disruption, traits of a resilient personality such as above average intelligence) are static or relatively stable factors, and thus cannot be easily targeted by interventions. In general, intervention and prevention programs should focus on factors that will most amenable to change (e.g., parental monitoring) as this will allow for more effective use of limited resources. However, in some circumstances historical or static factors may still be important. For example, youth who have experienced traumatic events in the past (e.g., witnessing or personally experiencing violence) may be at heightened risk to seek out gangs for a sense of protection due to ongoing symptoms of posttraumatic stress and anxiety. In such cases, youth would benefit from trauma-informed services even if exposure to violence or violent victimization is no longer occurring.

Second, intervention and prevention programs should target risk factors that are most important and most feasible (Wyrick & Howell, 2004). For example, not every risk factor will be important to a community's gang problem (e.g., social disorganization, poverty) or even the individual youth (e.g., risk taking and impulsivity). Community risk factors may be difficult to influence and may require long-term solutions. Addressing risk factors in individual, peer, family and school domains (e.g., after school programs for youth in impoverished and crime stricken neighborhoods) may have more of an immediate impact on community problems, even if they are of lesser importance (Wyrick & Howell, 2005).

Third, special consideration should be given to whether the at-risk or gang-involved youth has features of psychopathic personality disorder as this will impact service delivery and effectiveness of intervention and prevention programs, particularly if such programs emphasize protective factors. For youth with high symptoms of

psychopathy, such programs may increase the risk of subsequent gang involvement or offending. There are a number of youth psychopathy screening tools available (e.g., Antisocial Process Screening Device, Frick & Hare, 2001) that can help determine whether a youth should be referred to a more in-depth psychopathy assessment using the PCL:YV. Last, given that some gang youth in the current study reported gang involvement prior to the age of 13, it is important to address risk as early as possible before multiple risk factors have a chance to accumulate. Having a tool that can screen youth for risk factors associated with gang membership will help refer high-risk youth to intervention and prevention services targeted to their individual needs.

### **Assessing Risk and Protective Factors**

Of notable absence in the gang literature is an assessment tool that can help identify youth that are at moderate or high risk for gang involvement. Until prediction tools that include the broad array of risk for youth gang involvement are developed, violence risk assessment tools may be suitable in screening youth at risk for subsequent gang membership. However, one limitation of this approach is determining the appropriate cut point for youth being considered at high, moderate, or low risk for gang involvement. For example, Hill et al. (1999) found that seven risk factors substantially increased risk, whereas Esbensen et al. (2009) found that nine factors substantially increased risk. In the current study, ten or more risk factors substantially increased risk. Esbensen et al., (2009) also found that more risk factors were required before youth would join gangs as compared to being involved in violence. Thus, it is unclear how scores on violence risk assessment tools would translate into risk for gang involvement (e.g., should a youth rated as moderate risk for violence be considered a low risk for gang involvement? Should a youth rated at high risk for violence also be considered moderate risk for gang involvement?). While there is likely to no “magic number” of risk factors that would cause gang involvement and critical risk factors should be assessed on a case-by-case basis, general guidelines are needed to help facilitate communication among professionals (e.g., a youth with seven to ten risk factors may be at high risk for gang joining).

Although additional research is required before consensus can be reached regarding what factors protect against youth gang activity, assessment tools should also

incorporate protective factors. The results of the current study demonstrated that it is possible to use violence risk assessment tools to examine protective factors against youth gang membership, although only few differences in protective factors between gang and non-gang youth were observed. Consistent with previous studies of adolescent offenders, a substantial proportion of youth in this sample were not identified as having any of the six protective factors on the SAVRY (Penney, Lee & Moretti, 2010; Rennie & Dolan, 2010; Viljoen et al., 2012). This may be because the dichotomous (i.e., absent/present) rating of the SAVRY protective items underestimates or misclassifies the number of protective factors in the youth (i.e., youth with a protective factor possibly present rated as having it absent). Although additional measures of protective factors and strengths with Likert rating scales (e.g., the DAP) were included in this study, minimal differences between gang and non-gang youth were also observed on these measures. One possibility is that there may be protective factors unique to gang membership not captured by these tools. Another possibility is that measurement error was introduced for the self-report instruments included. For example, the youth scoring high on symptoms of psychopathy may have been particularly susceptible to inflating strengths. Future studies should consider incorporating a social desirability measure when including self-reported protective factors. Identifying protective factors on the basis of information from multiple sources may also be helpful in providing a more accurate indication of protective factors. Structured assessment tools such as the Short-Term Assessment of Risk and Treatability: Adolescent Version (START:AV; Nicholls, Viljoen, Cruise, Desmarais, & Webster, 2010) and the Structured Assessment of Protective Factors (SAPROF: YV; de Vogel et al., 2013) may be useful supplements to SAVRY risk factors, as these are completed on the basis of multiple sources collected through interview and file information, include a greater number of strengths than the SAVRY, and have 3-point rating scales. Future research should be conducted to examine the utility of additional strength-based assessments tools in differentiating protective factors between gang and non-gang youth. Having a broad assessment of protective factors would improve prediction and could lead to more guidance on appropriate intervention and prevention strategies.

## Limitations

It is important to note that there are several limitations of this study that may impact generalizability. First, because youth were non-gang or gang-involved prior to the start of the study the temporal relationship between gang entry and the presence/absence of risk and protective factors could not be established. Future research should be conducted using longitudinal designs to identify predictive risk and protective factors rather than concurrent variables (see Krohn & Thornberry, 2008). Second, not all protective factors negatively associated with youth violence (e.g., prosocial peer affiliation, negative attitudes towards delinquency and aggression) could be included in the current research as this information was not collected in the larger study from which the data were drawn. Future research should be conducted to include omitted protective factors, as this will help identify a greater number of factors that have protective effects against youth gang activity. Third, given the large number of moderation analyses tested, it is possible that some of the significant interaction effects were due to chance. Future research should be conducted to replicate these findings.

Fourth, it was not possible to determine whether the gang youth who engaged in criminal activity during the follow-up period did so during or after active gang membership. Also missing was a qualitative description of the motivation behind their offending (e.g., gang or non-gang related). As such this study was only able to demonstrate that a history of gang affiliation was associated with increases in violent and non-violent offending over the follow-up period. Fifth, as has been the case in several studies on gangs (Decker, 1996; Decker & Lauritsen, 2002; Gordon, 2000; Pyrooz & Decker, 2011), only a small number of gang-involved youth were identified. A larger sample size would increase the possibility of detecting true differences between gang-involved youth and youth not involved in gangs.

Sixth, respondents were allowed to identify themselves as gang members without references to an established definition. One disadvantage of this approach is that some individuals may identify themselves as gang members when in fact they are not really part of a gang (Bjerregarrd, 2002). Future studies should consider whether a more restrictive definition is appropriate. Potential criteria could include whether the gang possesses a number of organized characteristics, such as name, leader, group size and regular meetings (see Winfree et al., 1992). Although information pertaining to

gang characteristics were collected as part of the larger study from which the current data was drawn, because the OJJPD Comprehensive Model Survey was introduced halfway through the study less than half (47.3%) of the participants who self-identified as gang members provided this information.

Seventh, given that raters were not blind to the study outcome (i.e., whether the youth was non-gang or gang-involved) when completing the SAVRY and PCL:YV there was potential for criterion contamination. Knowing that a youth had current or past gang involvement could have led raters to increase the youth's scores on these measures. For example, ratings on the peer delinquency item of the SAVRY may have been conflated with gang involvement (i.e., a youth was automatically scored high on this item if they were in a gang). Similarly, gang-involved youth may have been rated higher on PCL:YV items such as stimulation seeking or criminal versatility. Future research examining differences between gang and non-gang youth on the SAVRY and PCL:YV should be conducted with raters blind to the youth's gang status.

Eighth, the sample of youth offenders included in the study are from British Columbia, and it might not be possible to generalize these findings to gang-involved youth in other provinces, although it is likely that future research in Canada might confirm the association of certain protective factors against gang involvement that were also identified in the current study. Multi-site examinations that include a number of different regional areas (e.g., urban, rural) across Canada would be useful in determining if there are similarities and differences in risk and protective factors against gang membership across different communities.

## **Future Research**

### **Gender-Specific Risk and Protective Factors**

In the current study, only male youth were examined due to the small number of females identified as being gang-involved. Although this suggests that male gender may be a risk factor for gang involvement (or conversely female gender is a protective factor), future studies should examine whether risk and protective factors against youth gang involvement differ across gender. Female youth represent a growing percentage of gang

members and are taking on more active roles in youth gangs (Abbotsford Youth Commission, 2010; Totten, 2008). Although females are playing a larger role in the gang world, the links between girls' involvement in gangs and their vulnerability to sexual exploitation remains a key area of concern (Totten, 2000). The involvement of females in gangs, generally, and the sexual exploitation of females in gangs, specifically, may be related to specific risk and protective factors. Compared to males, gang-involved females have experienced significantly higher rates of physical and sexualized violence and victimization in their childhood and this has been identified as a potential factor driving young women to a gang lifestyle (Saewyc, MacKay, Anderson & Drozda, 2008; Vigil 2003). Given that gender differences in pathways and risk factors for gang involvement exist, protective factors may also vary. However, little research is available on the involvement of girls in gangs. In addition to general gang involvement, little is known about female-specific protective factors against gang violence and as such there is a lack of gender-specific programs aimed at either preventing girls' involvement in gangs or mitigating girls' activities within these gangs. From a community and law enforcement perspective, identifying risk and protective factors in females can help to inform prevention and intervention program models that are gender-specific.

### **Race-Specific Risk and Protective Factors**

A number of theories and a growing body of research have examined the relationship between ethnic background and gang membership; however, little is known about the differences and similarities of risk and protective factors against gang involvement across different racial and ethnic groups (Curry & Spergel, 1992; Esbensen et al., 2010, Freng & Esbensen, 2007; Hill et al., 1999; Howell, 1998, Howell & Egley, 2005; Thornberry, 1998; Thornberry et al., 2003). Most of the research on youth gang violence and gang membership indicate that risk factors operate similarly for different racial groups; however, evidence also indicates that some risk factors for gang involvement may influence certain groups more than others. For example, Caucasian youth who had parents with lower educational levels and experienced increased levels of social isolation were more likely to join gangs, whereas for African-American and Hispanic youth, low commitment to school was associated with increased risk of gang involvement (Esbensen et al., 2010).

Although there was not sufficient power in the current study to examine whether risk and protective factors varied as a function of ethnic background, the examination of race-specific protective factors is of particular relevance. In Canada, the ethno-cultural composition of youth gangs is diverse, suggesting cultural issues are an important consideration in developing prevention and intervention programs for gang involvement. When dealing with Aboriginal youth, culture is particularly important given the history of colonization and assimilation efforts in Canada (e.g., residential schools; Green & Healy, 2003). Strong involvement in Aboriginal culture can protect against adverse outcomes, such as suicide, self-harm, alcohol misuse, and offending (Campbell et al., 2007; Chandler, & Lalonde, 2007; Hallet, Howard, 2010; Torres Stone et al., 2006). Future studies should examine whether cultural connectedness protects against the involvement of Aboriginal youth in gangs and whether cultural connectedness may play a similar protective role in other ethnic minority groups.

## **Conclusions**

Despite the limitations of the current study, as well as the need for further research on risk and protective factors associated with gang involvement in Canadian youth, this study had several advantages over existing research. The current study departed from previous studies of youth gang involvement in Canada by considering a broad range of risk and protective factors. As illustrated in the current study, the risk and protective factors associated with gang involvement become clearer when viewed through a multi-level and multi-disciplinary lens. Findings underscored the potential benefit of addressing risk factors across several domains and emphasizing protective factors in intervention and prevention efforts. The current study is also unique from previous research in that it directly analyzed whether protective factors for gang involvement had both direct and indirect effects on gang involvement using data on the same variables and from the same sample. Findings demonstrated the importance of considering multiple definitions of protective factors. Research that limits the exploration of protective factors to factors that have either direct (i.e., negative) effects or indirect effects, may overlook important protective factors against youth gang membership. One of the most important findings to emerge from the current research is that a one-size-fits-all approach to will not be effective in reducing gang involvement. While some of the

protective factors identified in the current study had negative effects on youth gang involvement, others aggravated risk in youth with psychopathic features. In addition, this study found that the use of multiple sources of information and multiple methods when studying the factors associated with gang involvement are important as they can provide unique information. In conclusion, the current study extends our understanding of protective factors for youth gang involvement and provides some preliminary insight into what may protect Canadian youth from joining gangs as well as increase their risk of gang involvement. Using research that is comprehensive, multi-faceted, and incorporates both risk and protective factors to inform gang prevention and intervention may result in effective strategies to prevent gang formation and its associated criminal activity.

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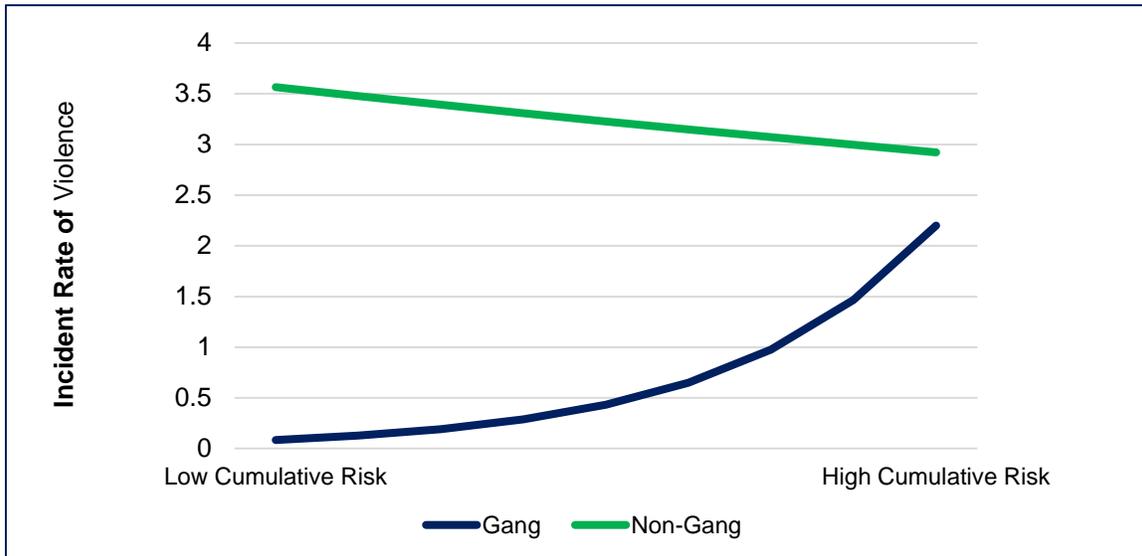
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## **Appendices**

## Appendix A.

### Does Gang Status Moderate the Relationship between Cumulative Risk and Offending?

Moderation analyses were also conducted to examine whether risk factors were more strongly predictive of any, violent, or non-violent offending for gang members than non-gang members over the follow-up period (i.e., 3-month, 12-month, average 4-year follow-up period, any offending). These analyses revealed that gang status significantly moderated the relationship between scores on the cumulative risk index and self-reported violent offending at the 3-month follow-up (see Figure A1),  $\text{Exp}(b) = 0.45$ ,  $\text{CI} [0.21-0.96]$ ,  $\text{Wald } \chi^2(1) = 4.33$ ,  $p = .04$ ;  $\text{Model } \chi^2(5) = 19.89$ ,  $p = .001$ . When youth were gang-involved scores on the cumulative risk index were more strongly predictive of the incident rate of self-reported violent offending. No other moderation analyses were significant.



**Figure A1.** Effect of Cumulative Risk on Self-Reported Violent Offending (3 Month Follow-Up) by Gang Status

## Appendix B.

### **Do Protective Factors Moderate or Mediate the Relationship between Domains of Risk and Gang Involvement?**

A series of logistic regression analyses was also conducted to examine whether protective factors had an indirect effect on the relationship between gang involvement and the number of risk factors in each domain. Four new variables were created to indicate whether participants had one or more risk factors in each of the following domains: individual, peer, family, and community. Because no differences between gang and non-gang youth with respect to risk factors in the school domain were observed in Research Question 1, school-related risk factors were not included in this analysis. Approximately, 99.10% of gang youth had at least one risk factor in the individual domain, 91.10% in the peer domain, 81.40% in the family domain, and 56.3% in the community domain compared to 0.90%, 8.90%, 18.80%, and 43.80% of non-gang youth. In addition, a new variable was created to indicate the number of risk domains present in the youth to examine whether protective factors could moderate or mediate the effects of having risk factors in multiple domains. Overall, having risk factors in multiple domains was more pronounced in gang youth. Approximately three-quarters of gang youth (73.50%) had risk factors in all four domains, 23.50% in three domains, 2.90% in two domains and 0.00% in one domain compared to 33.30%, 46.20%, 16.70% and 3.80% of non-gang youth.

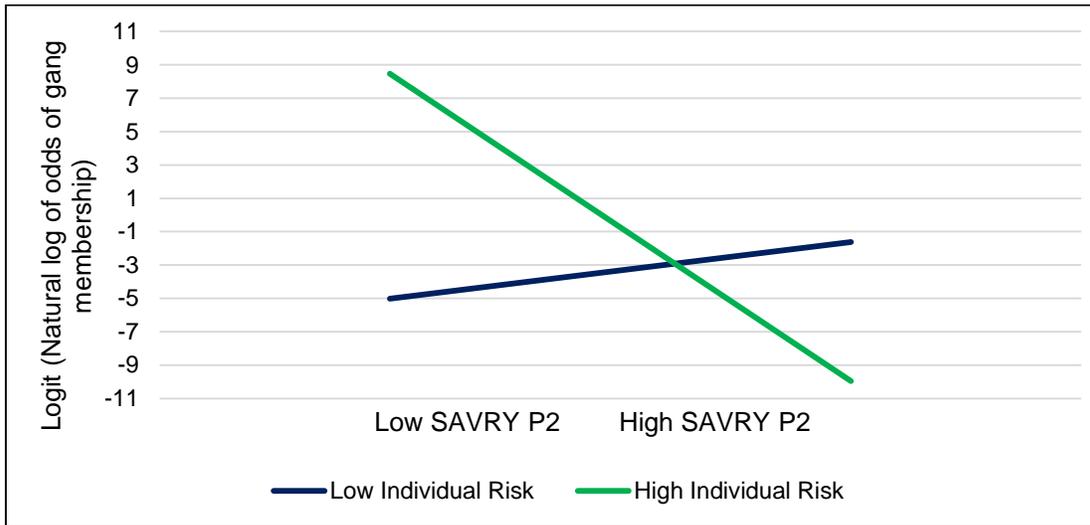
In total, 100 moderation and 100 mediation analyses (5 risk domain indices by 20 potential protective factors and scales) were conducted. No significant mediation effects of any of the variables were observed at  $p < .05$ . However, of the 100 moderation analyses conducted, five interaction terms were statistically significant at  $p < .05$  (see Table A1). Although these interaction terms did not remain significant after Bonferroni adjustment (i.e.,  $.05/100 = p < .0005$ ). The results of these analyses are presented in Figures A2 through A6.

**Table B1. Overview of Tested Moderation Effects (Protective Factor by Risk Domain)**

Protective Factor	Risk Domain				Number of Risk Domains
	Individual	Peer	Family	Community	
<b>SAVRY Protective</b>					
Total	--	--	--	--	--
P1	--	--	--	--	--
P2	Yes <sup>†</sup>	--	--	Yes <sup>†</sup>	--
P3	--	--	--	--	--
P4	--	--	--	--	--
P5	--	--	--	--	--
P6	--	--	--	--	--
<b>DAP</b>					
Social Competencies	--	--	--	--	--
Positive Identity	--	--	--	--	--
Positive Values	Yes <sup>†</sup>	--	--	--	--
Empowerment	--	--	--	--	--
Commitment to Learning	--	--	--	--	--
Constructive Use of Time	--	--	--	--	--
School Expectations	--	--	--	--	--
Neighbourhood Cohesion	--	--	--	--	--
<b>SSDP</b>					
Parental Supervision	--	--	--	Yes <sup>†</sup>	--
Attachment to Parents	Yes <sup>†</sup>	--	--	--	--
Presence of Caring - IPFI	--	--	--	--	--
Hollingshead's Index	--	--	--	--	--
<b>Cumulative Protective Index</b>	--	--	--	--	--

*Note.* -- indicates that the interaction term was not significant. P1 = Prosocial Involvement, P2 = Strong Social Support, P3 = Strong Attachment and Bonds, P4 = Positive Attitudes towards Invention and Authority, P5 = Strong Commitment to School/Work and P6 = Resilient Personality Traits on the SAVRY.

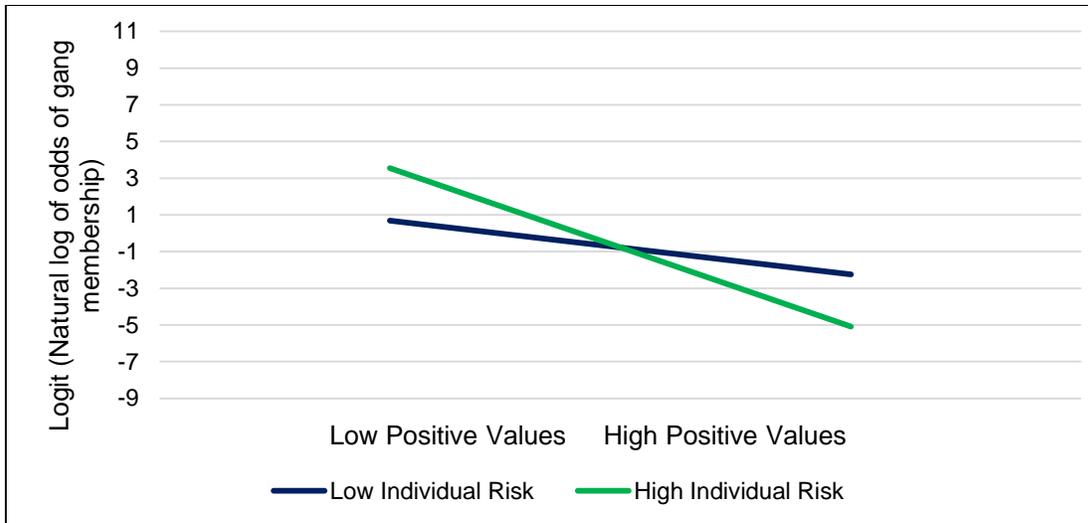
<sup>†</sup> Protective factor reduced the likelihood of gang involvement when risk factors were high.



**Figure B1. Effect of SAVRY P2 (Strong Social Support) on Gang Membership by Level of Individual Risk**

P2 (Strong Social Support) on the SAVRY was found to significantly moderate the relationship between the Individual Risk Domain and gang involvement (see Figure A2),  $\text{Exp}(b) = 0.21$ ,  $\text{CI} [0.06-0.71]$ ,  $\text{Wald } \chi^2(1) = 6.27$ ,  $p = .01$ ;  $\text{Model } \chi^2(3) = 13.52$ ,  $p = .004$ ;  $\Delta \text{Model } \chi^2(1) = 6.84$ ,  $p = .01^{22}$ . When individual risk was low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function of strong social support. In contrast, when individual risk was high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with strong social support.

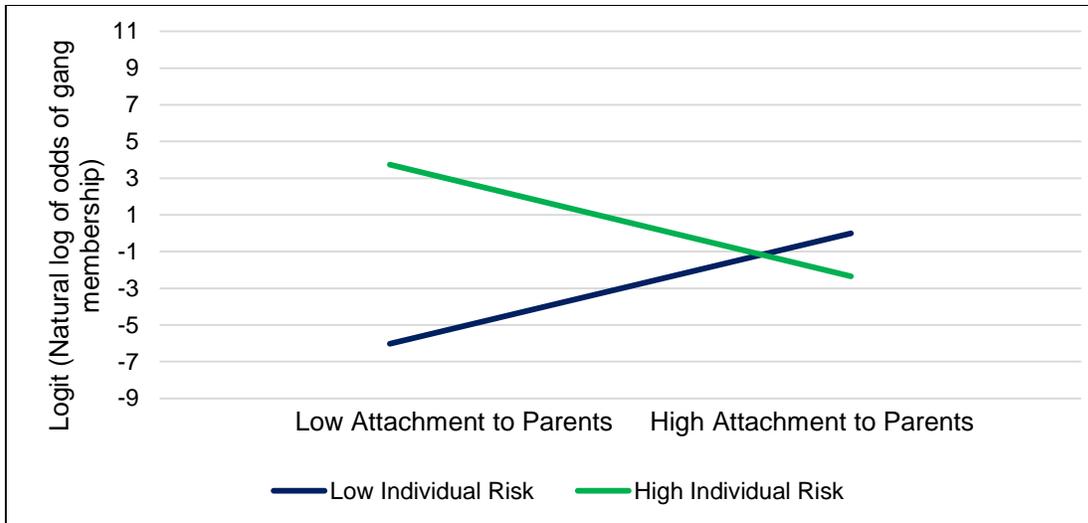
<sup>22</sup> Change from main effects only model.



**Figure B2. Effect of Positive Values on Gang Membership by Level of Individual Risk**

Positive Values on the DAP were found to significantly moderate the relationship between the Individual Risk Domain and gang involvement (see Figure A3),  $\text{Exp}(b) = 2.01$ ,  $\text{CI} [1.01-4.34]$ ,  $\text{Wald } \chi^2(1) = 3.96$ ,  $p = .07$ ;  $\text{Model } \chi^2(3) = 12.33$ ,  $p = .006$ ;  $\Delta \text{Model } \chi^2(1) = 4.53$ ,  $p = .03^{23}$ . When individual risk was low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function of positive values support. In contrast, when individual risk was high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with a high degree of positive values (i.e., two standard deviations above the mean).

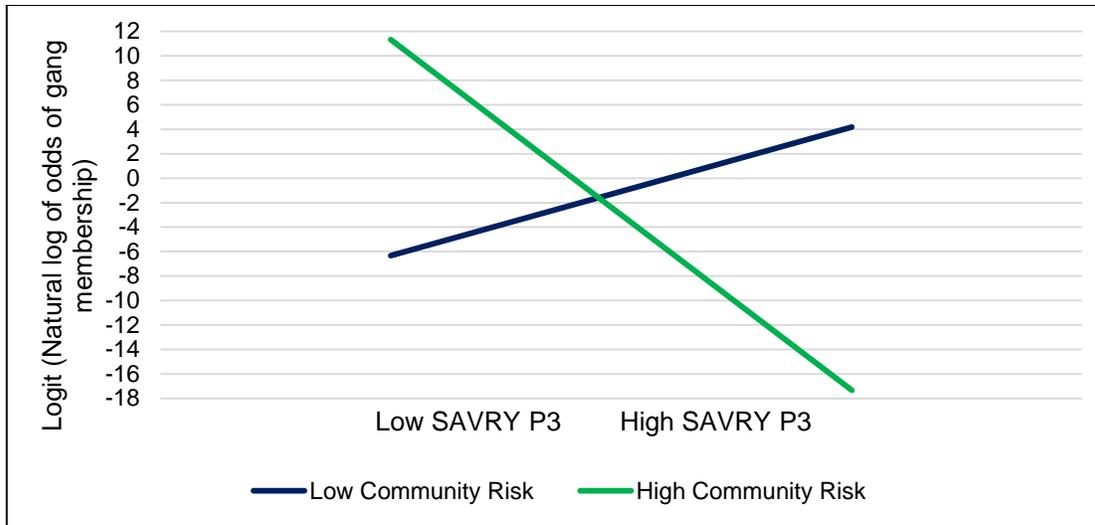
<sup>23</sup> Change from main effects only model.



**Figure B3. Effect of Attachment to Parents on Gang Membership by Level of Individual Risk**

Attachment to parents was found to significantly moderate the relationship between the Individual Risk Domain and gang involvement (see Figure A4),  $\text{Exp}(b) = 0.47$ ,  $\text{CI} [0.25-0.87]$ ,  $\text{Wald } \chi^2(1) = 5.70$ ,  $p = .02$ ;  $\text{Model } \chi^2(3) = 14.11$ ,  $p = .003$ ;  $\Delta \text{Model } \chi^2(1) = 6.62$ ,  $p = .01^{24}$ . When individual risk was low (i.e., two standard deviations below the mean), the probability of gang involvement increased in youth who had high attachment to parents (i.e., two standard deviations above the mean). In contrast, when individual risk was high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with a high attachment to parents.

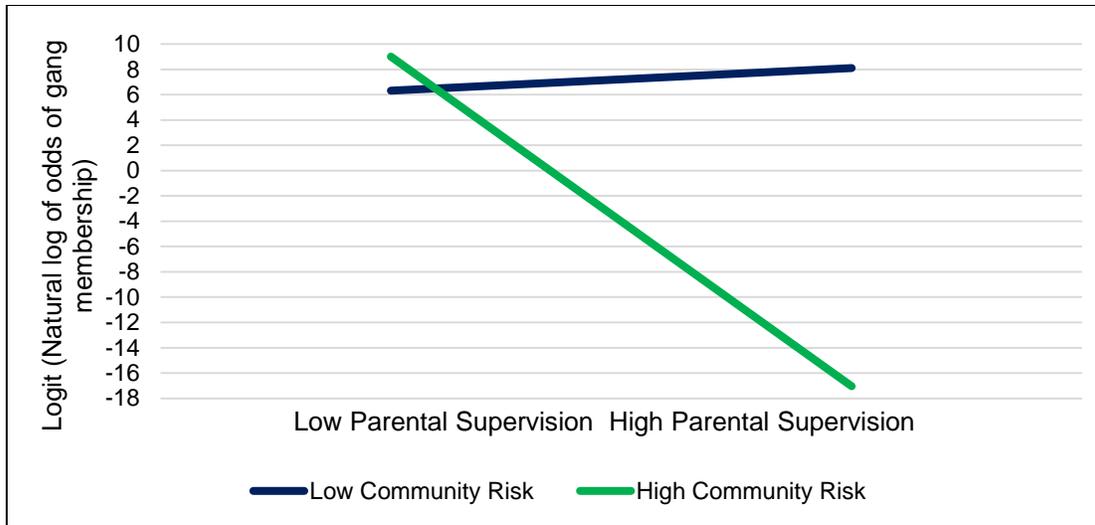
<sup>24</sup> Change from main effects only model.



**Figure B4. Effect of SAVRY P3 (Strong Attachment and Bonds) on Gang Membership by Level of Community Risk**

P3 (Strong Attachment and Bonds) on the SAVRY was found to significantly moderate the relationship between the Community Risk Domain and gang involvement (see Figure A5),  $\text{Exp}(b) = 0.09$ ,  $\text{CI} [0.01 -0.72]$ ,  $\text{Wald } \chi^2(1) = 5.14$ ,  $p = .02$ ;  $\text{Model } \chi^2(1) = 21.72$ ,  $p = .000$ ;  $\Delta \text{Model } \chi^2(1) = 5.39$ ,  $p = .02^{25}$ . When community risk was low (i.e., two standard deviations below the mean), the probability of gang involvement increased in youth who had strong attachment and bonds (i.e., two standard deviations above the mean). In contrast, when individual risk was high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with strong attachment and bonds.

<sup>25</sup> Change from main effects only model.



**Figure B5. Effect of Parental Supervision on Gang Membership by Level of Community Risk**

Parental supervision was found to significantly moderate the relationship between the Community Risk Domain and gang involvement (see Figure A6),  $\text{Exp}(b) = 0.08$ ,  $\text{CI} [0.01-0.80]$ ,  $\text{Wald } \chi^2(1) = 4.62$ ,  $p = .03$ ;  $\text{Model } \chi^2(3) = 20.55$ ,  $p = .000$ ;  $\Delta \text{Model } \chi^2(1) = 15.88$ ,  $p = .000$ <sup>26</sup>. When community risk was low (i.e., two standard deviations below the mean), the probability of gang involvement did not vary as a function of parental supervision. In contrast, when community risk was high (i.e., two standard deviations above the mean), the probability of gang involvement was reduced in youth with high parental supervision (i.e., two standard deviations above the mean).

<sup>26</sup> Change from main effects only model.