

Running head: VIOLENCE RISK ASSESSMENT

The Predictive and Concurrent Validity of the Structured Assessment  
for Violence Risk in Youth (SAVRY)

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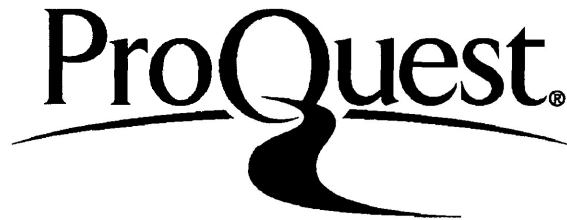
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## Abstract

Youth violence is a serious social problem that is often encountered in the criminal justice system. Currently, there are very few instruments available that have been specifically designed to assess violence risk in juvenile offenders. This study examined the predictive and concurrent validity of a new instrument, The Structured Assessment for Violence Risk in Youth (SAVRY), in a sample of adolescent offenders. The SAVRY was retrospectively coded using file information on 127 juvenile offenders aged 12 to 18 years. A follow-up period with a mean of 35.5 months ( $SD = 14.8$ , range = 6.0 to 61.0) was used to determine general and violent reoffending. Results substantiated the predictive validity of the SAVRY total score for both general and violent reoffending with Areas Under the Curve of .75 and .77, respectively. Similarly, analysis of the predictive validity of the SAVRY risk ratings indicated that youths in the higher risk categories were at significantly greater risk for both general and violent reoffending. As well, the SAVRY was found to be superior to the Youth Level of Service/Case Management Inventory in the prediction of both general and violent reoffending. Limitations of the current research are discussed.

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## The Predictive and Concurrent Validity of the Structured Assessment for Violence Risk in Youth (SAVRY)

Youth violence is a major public health concern (Koop & Lundberg, 1992). Although the rate of youth violence has stabilized over the past five years, the number of youths charged with violent crimes in Canada increased by 77% between 1988 and 1998 (Statistics Canada, 1999). ). In 2000, youths aged 12 to 17 were responsible for 16% of all Canadian violent crimes, and were more likely to commit violent crimes than adults (Statistics Canada, 2001). In the United States, despite the decline in arrest rates during the mid to late 1990s, the 1999 arrest rate for violent crime was still 15 percent higher than it was in 1983 (Cook & Laub, 2002). This official data may also only represent a segment of the actual amount of youth violence as arrest rates fail to account for violence that goes unreported or does not result in a conviction. Research has shown that the majority of aggravated assaults, robberies, and rapes are never reported to the police and that arrests are made in fewer than 50% of reported crimes (Cook & Laub, 1998; Snyder & Sickmund, 1999).

Although the actual amount of youth violence is difficult to determine, there is little disagreement that youth violence represents a serious social problem that must be addressed. Notwithstanding the costs to the victims, juvenile offenders require government financial resources to cover the cost of police investigations, criminal hearings, and incarceration. One American study determined that 1.3 to 1.5 million dollars could be conserved through the prevention of a single high risk youth from becoming a career criminal (Cohen, 1998). Overall, more effective prevention and management of youth violence would be both socially and financially desirable.

Youths who have already committed an offense represent one of the most important populations to target for violence reduction. This study investigates how a promising, new risk assessment tool, The Structured Assessment for Violence Risk in Youth (SAVRY) may assist in the classification and management of juvenile offenders. In order to better understand this instrument, an overview of violence risk assessment, risk factors for youth violence, approaches to risk assessment, and current tools for assessing violence risk will be provided.

### *Overview of Violence and Risk*

Recent literature on violence risk assessment often defines violence as 'actual, attempted, or threatened harm to a person or persons' (i.e. Boer, Hart, Kropp, & Webster, 1998; Hart, 1998; Webster, Douglas, Eaves, & Hart, 1997). In Canada, Criminal Code classifications of violent crime include minor assaults, such as pushing or shoving; serious attacks which result in physical injury; sexual assaults; robbery which may involve a threat to use force; display of a weapon; use of a weapon and actual physical force; abduction; infanticide; attempted murder; murder; and manslaughter (Statistics Canada, 2001). Definitions of violence vary to some degree, with some definitions reflecting only circumstances of physical harm, and others incorporating instances of possible harm, such as non-injurious gunfire or threats to use violence (Lyon, Hart, & Webster, 2001).

In terms of risk, current conceptualizations view risk as contextual and subject to change (Borum, 2000). Violence risk is a continuous variable and risk assessment involves determining the probability that a given event will occur (Borum, Fein, Vossekuil, & Berglund, 1990). Some authors have suggested that risk is also more complex than mere probability (Douglas & Ogloff, 2003; Dvoskin & Heilbrun, 2001; Mulvey & Lidz, 1995). Violence has been conceptualized as having different facets, each of which may be

important in violence risk assessment (Douglas & Ogloff, 2003). Mulvey & Lidz (1995) define risk in terms of five elements – nature, likelihood, frequency, seriousness, and imminence. Other elements that have been proposed are duration (Douglas & Ogloff, 2003) and whether or not the violence is targeted to a particular person or group (Estroff & Zimmer, 1994).

### *The Goals of Violence Risk Assessment*

There are many reasons a violence risk assessment is conducted. An assessment may be done to facilitate prediction/classification of the offender, management of the offender, or both. Prediction-oriented risk assessments aim to determine the probability that a specific event will occur within a given time period. Assessments focused on risk management seek to identify ways in which risk can be reduced. Overall, results from risk assessments provide information to assist decision-making related to sentencing, probation, parole, or other graduated release decisions (Cottle, Lee, & Heilbrun, 2001). Hart (1998) provides a useful definition of violence risk assessment as “the process of evaluating individuals to (1) characterize the likelihood they will commit acts of violence and (2) develop interventions to manage or reduce that likelihood”. Here, the goal of the violence risk assessment is twofold; the focus is on both determining and managing violence risk.

In general, violence risk can vary greatly among young offenders. Although some degree of antisocial behaviour is common for many youths, it has been found to be transitory for most adolescents with at least three quarters of young offenders ceasing all offending by their mid-20s (Farrington, 1986). This leaves a subset of offenders who continue criminal activity into adulthood. These chronic offenders commit a large proportion of crimes and are responsible for the majority of violent crime (Moffitt, 1993). One study found that approximately six to eight percent of male offenders are responsible for 50 - 70%

of general crime, commit 60 - 85% of violent crime, and in more than 80% of cases are first arrested in adolescence (Loeber & Stouthamer-Loeber, 1998). Correct identification of these serious juvenile offenders upon entry to the criminal justice system would assist professionals in developing more effective risk reduction strategies for this population. In turn, improved interventions could significantly reduce crime rates in both adolescence and adulthood.

### *Approaches to Violence Risk Assessment*

The area of risk assessment is dominated by two main approaches: the actuarial approach and the clinical judgment approach (Monahan, 1996). Currently, there is debate in the field of psychology over the relative merits of clinical versus actuarial predictions (Litwack, 2001). It is beyond the scope of this paper to provide a detailed review of the strengths and weaknesses of each approach (for reviews, see Buchanan, 1999; Grove & Meehl, 1996; Grove, Zald, Lebow, Snitz, & Nelson, 2000; Litwack, 2001). However, it is important to briefly consider some of the central features of each approach in order to understand the framework of risk assessment instruments.

The actuarial approach refers to a decision-making process that follows a set of fixed and explicit rules (Meehl, 1996). Actuarial risk scales consist of items that are quantified and then combined to produce a total score. Interpretation of the assessment data is highly standardized and relies on statistical procedures rather than human judgment. Overall, actuarial risk assessment maximizes the reliability of prediction by minimizing the effects of subjective human biases (Dawes, Faust, & Meehl, 1989; Grove & Meehl, 1996).

The actuarial approach has been criticized as having limitations when applied to the area of risk assessment (Borum, 2000; Douglas & Kropp, 2002; Litwack, 2001; McNiel et al., 2002; Otto, 2000). Some authors believe that actuarial tools may make inferences about



an individual based on group statistics without considering prominent information relevant to a specific individual (Borum, 2000; Douglas & Kropp, 2002; Otto, 2000). Also, actuarial tools have been criticized as not permitting an individualized appraisal of how risk factors may interact to increase or decrease risk in a given case (Borum, 2000). Actuarial tools also lack clinical utility when they fail to consider the contextual factors related to violence risk (Borum, 1996). Overall, there is question as to whether the pure actuarial approach lends itself to assessing risk for violence (Borum, 1996; Litwack, 2001; McNeil et al., 2002).

In terms of the clinical judgment approach, this method is often subdivided into unstructured and structured approaches. The hallmark of the unstructured clinical judgment approach is that the decision making process is not standardized. There are no specific data clinicians must consider and no parameters to guide interpretation. Not unexpectedly, this approach has been criticized as “informal, subjective, and impressionistic” (Grove & Meehl, 1996).

Overall, much of the research across various scientific domains suggests that the actuarial approach is better than unstructured clinical judgment (Borum, Otto, & Golding, 1993; Dawes et al., 1989; Grove & Meehl, 1996). In terms of violence risk assessment, actuarial assessments of dangerousness have been suggested to be more accurate than clinical judgment, or at least better than unstructured clinical assessments (Douglas, Cox, & Webster, 1999; Loza & Dhaliwal, 1997; Ward & Dockerill, 1999). Historically in the literature, the rejection of unstructured approaches seemed to imply the acceptance of the actuarial approach as the ideal method of violence risk assessment. In fact, the debate between unstructured clinical judgment and actuarial tools subsequently led to consideration of a different approach, one that focused on structuring clinical judgments (Borum & Douglas, 2003).

The approach that evolved from structuring risk assessment has been termed guided clinical assessment or structured professional judgment. In the structured professional judgment model, an explicit set of risk factors grounded in empirical research guides the assessment. The clinician codes each factor according to a specific set of guidelines explained in the assessment tool manual. Final determination of violence risk is made after consideration of all of the risk factors. This approach differs from pure actuarial approaches as violence risk is not indicated by a particular score but instead represents an informed decision made by the professional (Lyon, Hart, & Webster, 2001).

### *Factors Associated with Violence Risk in Youth*

The field of violence risk assessment has tended to focus on the identification of risk factors. A risk factor can be defined as “an aspect of personal behaviour or lifestyle, an environmental exposure, or an inborn or inherited characteristic which on the basis of epidemiological evidence is known to be associated with health-related condition(s) considered important to prevent” (Last, 2001). The relationship between risk factors and violence is multifaceted and complex. In many cases, risk factors co-occur and exert both direct and indirect effects on outcome. However, one finding that persists is that many risk factors have additive effects; that is, the more risk factors a youth is exposed to, the greater the likelihood that he or she will become violent. For example, one study found that a 10-year-old exposed to six or more risk factors is 10 times as likely to be violent by age 18 than a 10-year-old exposed to only one factor (Herrenkohl et al., 2000). The following sections provide a general overview of the variables found to be risk factors for violence in youths.

*Historical risk factors.* Historical risk factors refer to past behaviour or experiences that usually are static and unable to be changed. Historical risk factors for violence include a history of violence and/or delinquency, early onset of violence, a history of self-harm, past

treatment failures, poor school achievement, and family background variables such as a history of being abused or neglected. One historical factor, prior violent behaviour, has been shown to be one of the strongest predictors of future violence in adolescents (Farrington, 1991; Mossman, 1994; Tolan, Guerra, & Kendall, 1995). A history of non-violent offending also places a youth at increased risk for future violent behaviour (Farrington, 1989; Lipsey & Derzon, 1998). In one study, involvement in antisocial behaviours such as stealing, property destruction, smoking, selling drugs, and early intercourse (before age 14) were linked to later violence in males (Hawkins et al., 1998). As well, youths who have earlier onset of violence (before age 12) are at greater risk for future violence than youths with later onset of violence (Loeber, Farrington, & Waschbusch, 1998).

A history of supervision/intervention failures in adults has been linked to increased risk for violence (Andrews & Bonta, 1998; Simourd, Hoge, Andrews, & Leschied, 1994). These failures refer to a history of acts including disobeying curfews, violating no-contact orders, committing criminal acts while under probation, and not participating in court-ordered treatment (Borum et al., 2002). Poor school achievement has also been associated with increased risk for violence (Farrington, 1989). Academic failure beginning at the elementary level has been associated with increased risk for later violence and delinquency (Farrington, 1989; Herrenkohl et al., 2000; Maguin & Loeber, 1996). Truancy and not graduating high school have also been linked to delinquency and may be associated with increased risk of future violence (Farrington, 1989). As well, adolescents with a history of suicide attempts and/or self-harm have been found to be at greater risk for future violence (Apter et al. 1995; Garrison, McKeown, Valois, & Vincent, 1993). The higher prevalence of

suicidal behaviours in youthful offenders may be due to co-occurring higher rates of depressive, personality, and conduct disorders in this population (Eppright, Kashani, Robison, & Reid, 1993; Ulzen & Hamilton, 1998).

Certain historical family factors are also related to violence risk. Several studies have found that family violence increases a youth's risk for future violence (Elliot, 1994; Farrington, 1989). There is also mounting evidence that children who have been physically abused or neglected are more likely than others to commit violent crimes later in life (Lipsey & Derzon, 1998; Smith & Thornberry, 1995; Widom, 1989; Zingraff, Leiter, Myers, & Johnson, 1993). Studies have also shown that having antisocial parents in childhood increases a youth's risk for future violent behaviour (Baker & Mednick, 1984; Moffitt, 1987). In addition, research indicates that early separation from parents or primary caregivers is associated with increased risk for future violence and delinquency (Farrington, 1991; Henry, Avshalom, Moffitt, & Silva, 1996).

*Social/Contextual risk factors.* Social/contextual risk factors refer to factors in the environment that affect youths. Many social variables have been shown to be risk factors for youth violence including peer rejection and delinquency, stressful life events, lack of social support, poor parental management, and community disorganization. Research has shown that rejection by peers is a risk factor for future delinquency and violence (Coie, Lochman, Terry, & Hyman, 1992; DeRosier, Kupersmidt, & Patterson, 1994; Mayer, 1995). Affiliation with delinquent peers has been found to increase the risk for both future violence and general delinquency (Keenan, Loeber, Zhang, Stouthamer-Loeber, & Van Kammen, 1995; Moffitt, 1993). In addition, gang membership is a risk factor violence and research

has shown that gang membership increases the risk of violence above and beyond the risk posed by having delinquent peers (Battin, Hill, Abbott, Catalano, & Hawkins, 1998; Hill, Howell, Hawkins, & Battin-Pearson, 1999).

Although there is not much research on this topic, stressful life events have been linked to increased rates of aggression and violence (Attar, Guerra, & Tolan, 1994; Guerra, Huesmann, Tolan, Van Acker, & Eron, 1995). Poor social support has also been shown to increase the risk for violent behaviour (Estroff, Zimmer, Lachicotte, & Benoit, 1994). Research has shown that adolescents who have poor relationships with their parents and do not view their parents as supportive are at increased risk for violent behaviour (Lipsey & Derzon, 1998) and that adolescents with healthy family relationships characterized by availability, warmth, and good communication are at lowered risk for violence (Rodney, Tachia, & Rodney, 1997).

Poor parental management has been associated with increased risk for violence in youth (Capaldi & Patterson, 1996; Farrington, 1989; Hawkins, Arthur, & Catalano, 1995; Loeber & Farrington, 2000; Wells & Rankin, 1988). Parental management refers to a variety of parenting practices including discipline, supervision, and involvement by parents (Borum et al., 2002). Research has shown that overly strict, overly permissive, or inconsistent discipline is associated with increased violence risk in adolescents (Farrington, 1989; Hawkins, Arthur, & Catalano, 1995; Wells & Rankin, 1988). Other parenting practices, such as failure to set clear expectations for children's behaviour, poor parental monitoring, and poor involvement by parents, have been found to be associated with later delinquency and substance abuse (Capaldi & Patterson, 1996; Hawkins et al., 1995).

Community disorganization has been found to increase the risk for violence in youth (Elliott, Huizinga, & Menard, 1989; Maguin et al., 1995). Community disorganization refers

to living situations characterized by problems relating to crime, poverty, and/or violence (Borum et al., 2002). Maguin and colleagues (1995) examined community disorganization (crime, drug-selling, gangs, and poor housing) and found that youths from disorganized communities committed more acts of violence in late adolescence than those from healthier communities. It has been suggested that aspects of disorganized communities may exert indirect influences through poor parenting practices, lack of family resources, and parent criminality or antisocial behavior (United States Public Health Service, 2001).

*Individual/Clinical risk factors.* Individual risk factors are those factors that concentrate on attitudes and behaviours and include factors such as risk taking/impulsivity, substance abuse, anger management, and presence of a mental disorder. Certain antisocial attitudes and behaviours such as dishonesty, rule-breaking, hostility to police, and a generally favorable attitude toward violence, are risk factors for youth violence (Andrews & Bonta, 1998; Hawkins et al., 1998). Some research suggests that attitudes favouring violence may be more predictive of violent behaviour for adolescents than for younger children (Hawkins et al., 1998; Zhang, Loeber, & Stouthamer-Loeber, 1997). Risk taking behaviours and impulsivity have also been found to increase the risk for future violent behaviour (Eisenberg et al., 2000; Hawkins et al., 1998)

Another individual factor related to violence risk in youth is substance use. Research has shown that substance use, violence, and general delinquency share many of the same risk and protective factors (Abdelrahman, Rodriguez, Ryan, French, & Weinbaum, 1998; Hawkins et al., 1998). Individuals with substance use difficulties are at greater risk for both violence and general delinquency (Loeber & Dishion, 1983; Loeber & Hay, 1997). Substance use beginning before age 12 is one of the best predictors for later violence but substance use beginning in adolescence is not as strong a predictor (Lipsey & Derzon,

1998). Problems managing anger have also been linked to increased risk of aggressive behaviour (Granic & Butler, 1998). High levels of anger in children have been linked to problem behaviour at school (Smith, Furlong, Bates, & Laughlin, 1998). Often, anger management is targeted in violence reduction programs (Dangel, Deschner, & Rapp, 1989).

Low commitment to school, as evidenced by truancy, tardiness, not completing assignments, and having a negative attitude to school, has also been demonstrated to be a risk factor for violent behaviour in adolescence (Farrington, 1989; Lipsey & Derzon, 1998; Simourd et al., 1994). Research has indicated that low school commitment is associated with the risk of the most serious forms of delinquency including gang involvement (Esbensen and Deschenes 1998; Hill et al. 1999).

Other risk factors for youth violence pertain to personality variables and existing mental disorders. Research has shown that psychopathy, as defined by a score on the Psychopathy Checklist-Revised (PCL-R; Hare, 1991), is a robust predictor of general criminality and violent behaviour in adults (Harris, Rice, & Cormier, 1991; Hemphill, Hare, & Wong, 1998; Salekin, Rogers, & Sewell, 1996). Although research on adolescents has been less extensive than research with adults, adolescents who score high on the PCL-R are also at substantially higher risk for future recidivism and violence (Forth & Burke, 1998). Many of the traits included in the PCL-R, such as egocentricity, impulsivity, irresponsibility, shallow emotions, lack of empathy, guilt, pathological lying, manipulative behaviour, and the persistent violation of social norms and expectations, can be theoretically associated with increased violence risk. In fact, research has demonstrated that psychopaths lack characteristics for inhibiting antisocial and aggressive behaviour (Miller & Eisenberg, 1988) and show a impairment in empathy, fear of punishment, and guilt (Hare, 1991).

Research has also linked attention problems and hyperactivity with increased risk for future violence (Farrington, 1989; Klinteberg, Andersson, Magnusson, & Stattin, 1993). Research has shown that boys who meet the criteria for Attention Deficit Hyperactivity Disorder (ADHD) in childhood are at increased risk for conduct disorder and antisocial behaviour in adolescence and adulthood (Mannuzza et al., 1991). Some researchers have suggested that the association between ADHD and conduct problems may be due to co-occurring Oppositional Defiant Disorder in children diagnosed with ADHD (Biederman et al., 1996).

*Protective factors.* Protective factors are variables that potentially decrease the likelihood of violence. These factors can influence the level of risk an individual experiences or can moderate the relationship between risk and behavior (Jessor, 1993). Research has shown that resilience, strong social support, prosocial involvement, and positive attitudes toward school and authority figures may serve to decrease violence risk in at-risk adolescents. In terms of resilience, research has shown that children who are curious and enthusiastic, set goals for themselves, have high self-esteem, and retain an internal locus of control will be more resilient (Levy & Orlans, 1998). Related to resilience is the concept of prosocial involvement, which includes characteristics such as helping, recognizing others' feelings, and involvement in prosocial activities. In one study, prosocial behaviour as rated by teachers, appeared to be a protective factor for violence and delinquency, specifically for youths with numerous risk factors for committing crimes in early adolescence (Tremblay, Pihl, Vitaro, & Dobkin, 1994).

In addition, good social support has been proposed as a factor that may mitigate the effect of other risk factors (Jessor, 1993). Close bonds and enduring positive attachments to positive adults have been associated with resiliency and may represent a protective



factor against violent behaviour. Research shows that developing relationships with caring adults protects at-risk youth against becoming involved in violence (Beier, Rosenfeld, Spitalny, Zansky, & Bontempo, 2000; Blum et al., 2000). Furthermore, individuals with a positive response to authority have lower levels of re-offending in late adolescence (Hoge, Andrews, & Leschied, 1996). Strong commitment or attachment to school has also been associated with lowered risk of violence in adolescence (Hawkins et al., 1998).

### *The Current Status of Violence Risk Assessment*

Violence risk assessment has steadily improved over time. During the 1960s and 1970s, there was considerable doubt regarding the ability of mental health professionals to accurately predict violence (Cocozza & Steadman, 1976). A review of the field published in 1981 showed dismal results; only one out of three positive predictions of violence were correct (Monahan, 1981). Since then, substantial research has been conducted and the results support the claim that assessing violence risk is possible (Douglas et al., 1999). Currently, several instruments, such as the HCR-20 (Webster, Douglas, Eaves, & Hart, 1997), the Violence Risk Assessment Guide (VRAG; Quinsey, Harris, Rice, & Cormier, 1998), the Sex Offender Risk Appraisal Guide (SORAG; Hanson & Bussier, 1998), and the Spousal Assault Risk Assessment Guide (SARA; Kropp, Hart, Webster, & Eaves, 1999) have demonstrated moderate reliability and validity in determining violence risk in adults.

In terms of available violence risk assessment methods for adolescents, research is only beginning in this area (Borum, 2000). Currently, many professionals assess violence risk using unstructured judgment and utilizing assessment tools designed for an older population. The problems associated with unstructured judgment have already been explained. In addition, the use of adult assessment tools with adolescents raises many

ethical and clinical concerns. The pressing question is whether adults and adolescents differ considerably and whether these differences preclude the application of adult assessments to younger individuals.

Generally, adolescents differ from adults in areas such as life history, experience, cognitive maturity, and neurochemical/hormonal changes. Many tests used to assess violence risk in adults use historical factors, such as violence history, educational history, and relationship history that may not apply to younger individuals. Test users are then faced with decisions regarding whether certain items should be altered or removed. Such test modification may affect the reliability and validity of the test results. The removal of the violence history item may be especially problematic considering the fact that prior violence is perhaps the best single predictor of future violence (Farrington, 1991, Mossman, 1994).

Additionally, the period of adolescence is often marked by considerable change and development in several domains. Cognitive, emotional, behavioural, and relationship patterns may not yet be established and may be dynamic and developmental in nature. However, many adult violence risk assessments focus on static, historical factors and do not consider the role of dynamic factors such as peer relationships or environmental context. There is also question regarding whether certain factors, such as personality, can be considered stable in adolescents and therefore able to be validly and reliably assessed in this population. The Psychopathy Checklist-Revised (PCL-R), a tool developed for use with adults, investigates whether an individual meets the cutoff score for psychopathy, a stable personality disposition. Debate exists as to whether or not this construct-based test can be applied to youths considering that personality traits and disorders may not be stable

in adolescents. In fact, the PCL-R test manual cautions that the tool is not designed for those under 18 years of age. Overall, the preferred situation for the forensic field is to have risk tools specifically designed to assess violence risk in adolescents.

Another approach to determining violence risk in adolescents has been to use assessment tools that are known to predict general recidivism. This can be problematic given that violent recidivism represents only a subset of all recidivism. Thus, it could be expected that using assessments for general recidivism to assess violence risk would result in over prediction.

One instrument that is often used to predict recidivism in juvenile offenders is the Youth Level of Service/Case Management Inventory (YLS/CMI; Andrews & Bonta, 2002). The YLS/CMI was derived from the framework of the adult tool, the Level of Service Inventory-Revised (LSI-R; Andrews & Bonta, 1995), and was based on factors known to be associated with recidivism. The YLS/CMI consists of a 42-item checklist that is divided into eight subscales: offense history, family circumstances/parenting, education, peer relations, substance use, leisure/recreation, personality/behaviour, and attitudes/orientation. The checklist is completed by a qualified professional based on interviews with the youth and a review of collateral information and clinical records. Results from the YLS/CMI are intended to assist in categorizing a youth into one of four risk levels (i.e., low, moderate, high, and very high) in terms of likelihood of continued offenses. This determination of risk level is designed to assist in the management of the needs of the juvenile offender. Research on the YLS/CMI is limited but studies have shown that the YLS/CMI total score and subscale scores significantly discriminate between offender and non-offender groups (Costigan & Rawana, 1999; Jung & Rawana, 1999; Schmidt, Hoge, & Gomes, in press).

### *Structured Assessment for Violence Risk in Youth (SAVRY)*

A newly developed instrument for evaluating violence risk in adolescents is the Structured Assessment for Violence Risk in Youth (SAVRY; Borum et al., 2002). This tool is specifically intended to assist in the assessment of youths between the ages of 12 and 18 (Borum et al., 2002). The structure of the SAVRY is modeled after the HCR-20 (Webster et al., 1997), a tool that provides 20 historical, clinical, and risk management variables empirically supported in the literature as correlates of violence. The SAVRY is based on the structured professional judgment model and contains 30 items drawn from existing research and literature on adolescent development and youth violence. The 30 items are grouped into four sections: Historical, Social/Contextual, Individual/Clinical, and Protective Factors. Examples of items included on the SAVRY are violence history, poor school achievement, social support, peer delinquency, risk taking/impulsivity, and substance use. Recently, the SAVRY item Psychopathic Traits, which involved using a PCL-YV score, was changed to Low Empathy/Remorse.

The aim of the SAVRY is to help professionals make an informed evaluation of violence risk in youths that will aid intervention and management decisions. The final risk rating for the SAVRY represents a structured judgment that is based on consideration of empirically derived items associated with violence risk. This summary risk rating is listed as being low, moderate, or high. Although these ratings are not linked to specific scores or base rates in the population, empirical studies often find a linear relationship between the number of risk factors and violence risk (Borum et al., 2002). The identification of risk factors, especially those that are dynamic and modifiable, also assists professionals in

determining possible areas for risk reduction. The inclusion of these dynamic factors in the SAVRY enables the detection of changes in risk, a novel and useful concept considering that most current adult tools focus mainly on stable factors.

### *Current Research on the SAVRY*

Research on the ability of the SAVRY to assess violence risk is in its preliminary stages. However, a few studies have been conducted and these results are promising. One study, done by Bartel, Borum, and Forth (2004), was a retrospective analysis of three population samples, two of which were incarcerated male adolescents, and one of which was a community sample. Violence was measured in terms of aggressive behaviour while incarcerated as well as by violent behaviours related to conduct disorder as outlined by the Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 2000). The risk ratings were quantified in order to enable statistical analysis. When compared to incarcerated youths, community youth scored much lower on the risk domains and had lower final risk ratings. The results indicated that for the incarcerated youths all three risk domains (Historical, Social, and Individual) correlated significantly with each other as well as with the total score. The Protective Domain was inversely correlated with the risk domains and the final risk rating. Institutional aggressive behaviour was predicted by all three risk domains as well as by the final risk rating. The associations were strongest for the SAVRY final risk rating ( $r = .40-.52$ ) and for the Individual Domain ( $r = .40-.45$ ).

Another study that examined the predictive ability of the SAVRY (McEachran, 2001) also focused on male adolescents in conflict with the law. However, in contrast to the last study which considered violence during incarceration, this research examined convictions after sentencing was completed. As well, this study aimed to assess the ability of the

SAVRY to predict non-violent recidivism as well as violent recidivism. The results indicated that the violent recidivists scored significantly higher than the non-recidivists on the three risk domains and on the SAVRY final risk rating. As well, the violent recidivists scored significantly lower on the Protective Domain. The non-violent recidivists scored significantly higher than the non-recidivists on the SAVRY final risk rating and on all domains except the Individual Domain. Interestingly, when violent and non-violent recidivists were compared, only the Individual Domain distinguished between these two groups. Thus, the results of this study suggest that the SAVRY may not differentiate between violent and non-violent recidivism.

The third available study on the SAVRY (Catchpole & Gretton, 2003) examined the forensic files of 63 incarcerated male youths and 11 incarcerated female youths. The follow-up period to determine convictions was one-year after discharge and after treatment. In this study, only the SAVRY final risk ratings (low, moderate, high) were compared to future convictions. The results indicated that these risk ratings differentiated risk for violent recidivism among juvenile offenders. Only one youth out of 17 youths deemed to be low risk on the SAVRY violently reoffended during the follow-up period. In comparison, eight out of 20 youths deemed high risk on the SAVRY violently reoffended.

Although these studies conducted on the SAVRY represent positive contributions to the literature, past research has had several limitations. First, only the study done by McEachran (2001) adequately explored whether or not the SAVRY risk rating can discriminate between violent and non-violent recidivism. Central to the effectiveness of the SAVRY is that it is intended to assess violence risk specifically. However, if individuals who commit violent offenses also commit non-violent crimes, then it is not feasible to define two mutually exclusive categories. This remains an area for further investigation. In addition,

only one study (Catchpole & Gretton, 2003) included females in the analysis of risk and even then the sample size for females was small ( $N = 11$ ). Thus, there is question as to whether or not scores on the SAVRY are predictive of violent recidivism in female juvenile offenders.

Another limitation surrounds the quantification of the SAVRY subscales in several studies. The only variable listed in the SAVRY manual as relevant to violence risk determination is the final risk rating. Thus, conclusions regarding the use of single subscales in violence risk assessment should be made with caution. In addition, previous research on the SAVRY has produced some seeming contradictions in terms of the predictive ability of the final risk ratings. For example, McEachran (2001) found that high risk ratings were associated with violent recidivism 83% of the time. However, although Catchpole and Gretton (2003) found that high risk ratings identified the majority of violent recidivists, 12 out of 20 juvenile offenders deemed to be at high risk for future violent offending were not convicted of a violent offense during the follow-up period. These results suggest that the SAVRY may have greater sensitivity than specificity.

### *The Present Study*

Although the SAVRY is a potentially useful and unique tool for violence risk assessment, more research is necessary to clarify its effectiveness before it is used extensively in clinical settings. The main objective of this study is to contribute to the empirical evidence currently available on the SAVRY by investigating the ability of the tool to predict violent recidivism in a sample of juvenile offenders. An additional goal is to provide more evidence regarding the use of the tool with females given that much of the past research has focused on males. Also of interest is whether the SAVRY maintains

its predictive validity when used with different ethnic groups, namely Native Canadian youths. Finally, another objective of this study is to examine how the predictive validity of the SAVRY compares to that of the YLS/CMI.

## Method

### *Participants*

Participants for this study consisted of 127 juvenile offenders with a mean age of 14.9 years ( $SD = 1.4$ , range = 12.0 to 18.5). These individuals were taken from a total sample of 133 court-referred juvenile offenders in Northwestern Ontario, Canada. Six of these 133 youths were excluded from the sample due to a lack of file information with which to code the SAVRY ( $n = 3$ ) and a lack of recidivism data ( $n = 3$ ). These 127 juvenile offenders were referred to Lakehead Regional Family Center, a children's mental health center, for a multi-disciplinary assessment to assist the court and/or probation. For 108 (85%) of the participants, the type of assessment requested was a Section 34 report and for 16 (15%) of the participants the assessment was related to probation. Data for type of assessment were unavailable for 4 (3%) of the juvenile offenders.

The sample consisted of 80 (63%) males and 47 (37%) females. Reflecting the ethnic composition of the local community, 88 (69%) participants were Non-native, and 39 (31%) participants were Native Canadian, as defined by Native heritage of at least one parent. In terms of prior criminal charges, 57 (50%) youths had at least one past criminal charge, and 35 (28%) youths had at least one past serious offense. Consideration of the nature of the present offenses revealed that 21% were referred for a sexual offense, 33% for a property offense, 46% for a person offense, and 33% for any other type of offense. These percentages do not add to 100% given that youths can have multiple present offenses.



## *Measures*

*SAVRY.* The SAVRY is an assessment tool consisting of 24 risk items grouped into three domains: Historical (10 items), Social/Contextual (6 items), and Individual/Clinical (8 items). An additional six items are contained under the heading of Protective Factors. For a complete listing of items, see Table 1. All of the risk items are rated on a three-point scale (low, moderate, high). The Protective Factors are rated as either present or absent. Instructions for coding each item are provided in the SAVRY manual. After the items are coded, the professional provides a final risk rating (low, moderate, high) of the risk for future violence.

*YLS/CMI.* The YLS/CMI is a 42-item checklist divided into eight subscales: offense history, family circumstances/parenting, education, peer relations, substance use, leisure/recreation, personality/behaviour, and attitudes/orientation. A qualified professional completes the checklist using clinical records, interviews, and collateral sources as the sources of information. Each item is coded as either present or absent, with the total score ranging from 0 to 42. Results from YLS/CMI are used to categorize youth into four risk levels (i.e., low, moderate, high, and very high) in terms of the risk for future offending.

*Recidivism Data.* Recidivism data were obtained by accessing each youth's complete criminal records in the Royal Canadian Military Police (RCMP) national police registry. These data were already available in a database at Lakehead Regional Family Centre, and therefore were not collected by the investigators of this study. Information regarding recidivism, type of offense committed, length of time to new offense, and number of new offenses was available. Only convictions were counted as offenses when determining recidivism. A violent reoffense was defined as it is in the SAVRY manual; violence constitutes any act of physical violence that is sufficiently severe to cause injury,

any act of sexual assault, or a threat made with a weapon in hand (Borum et al., 2002). Violent reoffenses included murder, manslaughter, attempted murder, assault, sexual assault, robbery, kidnapping, possession of a weapon, and arson. Non-violent recidivism consisted of any conviction that did not meet the criteria for a violent act, and included theft, possession of stolen property, driving offenses, drug offenses, fraud, and escaping custody. General or any reoffending was defined as any recidivism, either violent or non-violent, that resulted in a conviction.

### *Procedure*

Ethical approval for this study was granted by Lakehead Regional Family Centre and Lakehead University (see Appendices A and B). Data were collected for each juvenile offender as part of a standardized assessment procedure completed by a multidisciplinary mental health team (including disciplines of social work, psychology, and psychiatry). The SAVRY was coded using this information and a total score and a final risk rating were determined. The total score was determined by quantifying each item (low = 0, moderate = 1, high = 2) and adding all items except those items under the heading of Protective Factors. The final risk rating was made as a professional judgment based on the results of all of the SAVRY items. In order to examine interrater reliability of the SAVRY coding, 29% of the offender files were coded by both the primary researcher as well as by a registered psychologist.

Ratings for the YLS/CMI were obtained from past assessments conducted by probation officers and this data was available in an existing database. For 19 of the 127 juvenile offenders in the database, there was no YLS/CMI completed and these individuals were excluded from the sample used to determine the predictive ability of the YLS/CMI. Another seven youths were excluded because the most recent available YLS/CMI was

completed more than 12 months before or after the original court-ordered assessment used to code the SAVRY. Thus, the total sample size used to determine the validity of the YLS/CMI included 101 juvenile offenders with a mean age of 14.6 years ( $SD = 1.1$ , range = 12.0 to 17.0). The average length of time between completion of the YLS/CMI and the court-ordered assessment for this revised sample was 1.2 months ( $SD = 3.3$ , range = 0 to 11.0). The follow-up period began immediately following disposition. If incarceration occurred, time spent in the correctional facility was deducted from the follow-up period.

## Results

### *Descriptive Statistics*

*Risk Classification.* SAVRY total scores ranged from 2 to 40 (out of a possible range of 0 to 48). The mean SAVRY total score was 21.85 ( $SD = 8.59$ ). Descriptive statistics for the SAVRY total score and the three risk domains (Historical, Social, Individual), with analysis by gender, are presented in Table 2. For the SAVRY final risk rating, 36 (28%) youths were identified as low risk, 57 (45%) were identified as moderate risk, and 34 (27%) were identified as high risk. The mean score for each risk level was as follows: low ( $M = 11.2$ , range = 2 to 17), moderate ( $M = 23.0$ , range = 15 to 30), high ( $M = 31.2$ , range = 26 to 40).

The overall MANOVA for SAVRY total score and the risk domains for males and females was nonsignificant,  $F(3, 123) = 1.12$ ,  $p = .35$ . The overall MANOVA for SAVRY total score and the domains for native and non-native individuals was significant,  $F(3, 123) = 6.51$ ,  $p < .001$ . Univariate analyses revealed that native individuals had significantly higher scores than non-native individuals for the Historical Domain,  $F(1, 125) = 11.15$ ,  $p = .001$ , the Social Domain,  $F(1, 125) = 13.25$ ,  $p < .001$ , and total score,  $F(1, 125) = 8.98$ ,  $p = .003$ . No effect of ethnicity was found for the Individual Domain,  $F(1, 125) = .85$ ,  $p = .359$ .

When males and females were compared on other demographic variables, no gender differences were found for age,  $t(125) = -.61, p = .54$ , ethnicity,  $X^2(1, N = 127) = .51, p = .82$ , or seriousness of present offense,  $X^2(1, N = 120) = 3.73, p = .053$ . Classification of an offense as serious was based on a serious offense list used by Hoge, Andrews, and Leschied (1995). Serious offenses included murder, manslaughter, attempted murder, wounding/assault, common assault, aggravated assault, sexual assault, armed robbery, break and enter with intent, break/enter/theft, theft greater than \$5000, auto theft, arson, and drug trafficking. For ethnicity, no differences between native and non-native youths were found for age,  $t(125) = .88, p = .38$ , gender,  $X^2(1, N = 127) = .051, p = .82$ , or seriousness of present offense,  $X^2(1, N = 120) = .14, p = .89$ .

*Follow-up Period and Reoffending Patterns.* The average length of the follow-up period for the entire sample of juvenile offenders ( $N = 127$ ) was 35.5 months ( $SD = 14.8$ , range = 6.0 to 61.0). Ninety-six offenders had follow-up periods of two years or more. Thirty-eight (30%) offenders served time in custody for their present offense and the average length of time served was three months (range = 1.0 to 9.0). During the follow-up period, 59 (47%) of the youths committed at least one offense and 34 (27%) committed at least one violent offense. Descriptive statistics for the reoffending indices (general recidivism, violent recidivism, number of new offenses, and mean time to new offense, with analysis by gender and ethnicity, are presented in Table 3. Chi-square analysis by gender for any reoffending was not significant,  $X^2(1, N = 127) = 3.62, p = .057$ , and also not significant for violent reoffending,  $X^2(1, N = 127) = 2.00, p = .16$ . For ethnicity, no differences were found for any reoffending  $X^2(1, N = 127) = 1.24, p = .27$ , but native youths were found to be more likely to violently reoffend,  $X^2(1, N = 127) = 8.12, p = .004$ .

### *Reliability*

Interrater reliability estimates were calculated for each of the SAVRY component risk domains, along with the Protective Factors, the total score, and the final risk rating. Intraclass correlations ( $n = 29$ ) for the domains were as follows: .95 for Historical, .87 for Social, .91 for Individual, and .85 for Protective Factors. Intraclass correlations using the one-way random effect model were .96 and .92 for total score and final risk rating, respectively. All were statistically significant ( $p < .001$ ). Although the SAVRY and its component risk domains are not considered to be scales, the internal consistency of the SAVRY total score was analyzed and found to be .83 for the sample. Alpha coefficients for the Historical, Social, and Individual domains were .66, .52, and .72, respectively.

### *Correlations between Domains*

The associations between the SAVRY risk domains, Protective Factors, and total score are presented in Table 4. The three risk domain totals (Historical, Social, Individual) were significantly correlated with each other and with the SAVRY total score ( $p < .01$ ). As expected, the Protective Factors total was significantly inversely correlated with the domain totals and with the total score.

### *Predictive Validity of SAVRY Domains and Total Score*

Four indices of reoffending were employed to evaluate the predictive validity of the SAVRY total score and risk domains: any reoffense, violent reoffense, number of new offenses, and time to new offense. Correlations between the SAVRY domains and the reoffending indices are presented in Table 5 and correlations between the SAVRY total score and the reoffending indices by total sample, gender, and ethnicity are presented in

Table 6. In all cases, higher SAVRY total scores were significantly associated with increased general offending, increased violent offending, increased number of new offenses, and decreased time to reoffend.

*Receiver Operating Characteristic (ROC) Analyses.* ROC curves are used to assess an instrument's ability to predict an event with a dichotomous outcome. ROC analyses produce a graph where sensitivity is plotted against specificity in the form of a curve. The area under the curve (AUC) reflects the probability that an individual who recidivated will score higher on the measure than an individual who did not recidivate (Douglas & Webster, 1999). Basically, the larger the AUC is, the greater the accuracy of prediction. Results for ROC analyses using the SAVRY total score were .75 (95% CI = .67 - .83) for any reoffending and .77 (95% CI = .67 - .87) for violent reoffending. Table 7 provides the AUCs for the SAVRY domains and total score.

#### *Predictive Validity of SAVRY Risk Levels*

Each risk level was analyzed by total sample, gender, and ethnicity to produce results for the rate of any reoffending, the rate of violent offending, the mean number of new offenses, and time to reoffend. The results for the total sample with analysis by gender are presented in Table 8.

*Chi-Square Analysis for Any Reoffending.* Chi-square analysis by risk level for the total sample was significant for any reoffending,  $X^2(2, N = 127) = 20.60, p < .001$ , with youths in the higher risk categories having a higher rate of general reoffending. Results were also significant for males,  $X^2(2, n = 80) = 15.35, p < .001$ , and for females,  $X^2(2, n = 47) = 7.82, p = .02$ . As well, results were significant for native youths,  $X^2(2, n = 39) = 13.61, p = .001$ , and for non-native youths,  $X^2(2, n = 88) = 11.04, p = .004$ .

*Chi-Square Analysis for Violent Reoffending.* In terms of violent reoffending, chi-square analysis for the total sample was significant,  $\chi^2(2, N = 127) = 25.41, p < .001$ , with youths in the higher risk categories being at greater risk for violent reoffending. Results were also significant for males,  $\chi^2(2, n = 80) = 15.67, p < .001$ , and for females,  $\chi^2(2, n = 80) = 14.66, p = .001$ . Similarly, results were significant for native youths,  $\chi^2(2, n = 39) = 16.03, p < .001$ , and for non-native youths,  $\chi^2(2, n = 88) = 10.67, p = .005$ .

*Analysis of Variance for Number of New Offenses.* For mean number of new offenses, a significant effect was observed across the SAVRY risk levels,  $F(1, 115) = 6.47, p = .002$ , with individuals in higher risk categories committing more new offenses. Post-hoc analysis for risk level using Tukey's HSD revealed significant effects for all comparisons. There was no significant effect for gender,  $F(1, 115) = 2.62, p = .109$  and no risk level by gender interaction,  $F(1, 115) = 1.29, p = .280$ . There was no significant effect for ethnicity,  $F(1, 115) = 2.87, p = .054$ , but there was a risk level by ethnicity interaction,  $F(2, 115) = 4.92, p = .009$ . For those in the moderate risk category, native youths had significantly more new offenses than non-native individuals.

*Analysis of Variance for Time to New Offense.* For mean time to new offense, a main effect was found for risk level,  $F(2, 121) = 5.68, p = .004$ , with individuals in higher risk levels having decreased time to reoffend. Post-hoc analysis for risk level using Tukey's HSD revealed significant effects for all comparisons. There was no significant effect for gender,  $F(1, 121) = .449, p = .50$  and no risk level by gender interaction,  $F(2, 121) = 2.38, p = .10$ . There was no significant effect for ethnicity,  $F(1, 115) = .774, p = .381$  and no risk level by ethnicity interaction,  $F(2, 115) = .617, p = .541$ .

### *Comparison of Structured Clinical Ratings and Cut-off Scores*

The data were explored to determine if the number in each risk level and the violent reoffending rate for each risk level would change if cut-off scores, instead of structured professional judgment, were used to define risk levels. Frequency tables were examined and the cut-off scores were chosen on the basis of how well they could produce data similar to the results obtained using structured professional judgment. Table 9 provides the number of youths in each risk level and the violent reoffending rate for each level for both methods of risk level determination. Visual examination of the number in risk level and violent reoffending rate for each level revealed that results for each method were quite similar.

### *Predictive Validity of the YLS/CMI*

The predictive validity of the YLS/CMI was investigated to determine if the SAVRY can better predict violent reoffending than a measure designed to assess risk for general reoffending. The sample used to determine the validity of the YLS/CMI ( $N = 101$ ) was compared to the sample used for the SAVRY ( $N = 127$ ) to determine if the two samples significantly differed on a number of variables. Using 95% confidence intervals to determine significant differences, the samples were found to be equivalent for age, gender, ethnicity, seriousness of present offense, SAVRY total score, the rate of general reoffending, and the rate of violent reoffending.

Two indices of reoffending were employed to evaluate the predictive validity of the YLS/CMI total score: any reoffense and violent reoffense. In terms of the YLS/CMI subscales, none was significantly associated with general reoffending. Only two of the subscales were significantly associated with violent reoffending, the Family Circumstances/Parenting Subscale,  $r(101) = .24, p = .017$ , and the Substance Abuse Subscale,  $r(101) = .20, p = .045$ . For the YLS/CMI total score, no significant correlations



were found for general or violent reoffending. ROC analyses conducted using the YLS/CMI total score yielded AUCs of .59 (95% CI = .48 to .71) for any reoffending and .62 (95% CI = .50 to .74) for violent reoffending. In addition, each risk level was analyzed by total sample to produce results for the rate of any reoffending and the rate of violent offending. Chi-square analysis by risk level for the total sample was nonsignificant for any reoffending,  $X^2(2, N = 101) = 3.68, p = .298$ , and also nonsignificant for violent reoffending,  $X^2(2, N = 101) = 4.83, p = .185$ .

### Discussion

Given that violent crime represents a serious social problem and that only a subset of juvenile offenders recidivate violently, it is important to identify and target youths who are likely to commit a future violent offense. The present study provides support for the use of the Structured Assessment for Violence Risk in Youth (SAVRY) as a tool for assessing violence risk in adolescent offenders. In addition, the SAVRY appears to be superior to the Youth Level of Service/Case Management Inventory in the assessment of violence risk.

The individuals in this study represented a broad spectrum of juvenile offenders of varying criminal histories and ages. In addition, the sample was comprised of 37% females and 31% native youths, enabling investigation of gender and ethnicity effects. The juvenile offenders had a mean SAVRY total score of 21.85, which falls near the middle of the range for the SAVRY, and the scores were normally distributed. Also, each risk level was represented by at least 26% of the sample which allowed for comparisons between risk levels. In addition, very low base rates of outcome variables were avoided, with 46.5% of youths committing any reoffense and 26.7% committing a violent offense during the follow-up period.

In terms of the reliability of the SAVRY, two forms were assessed: internal consistency and interrater reliability. Although the risk domains and protective factors domain were not designed as scales, all but one possessed moderate to strong levels of internal consistency. Only the social domain fell below the standard cutoff of .60 for this form of reliability. Also, given that the SAVRY has the potential to become widely used in both clinical and forensic settings, it is important to demonstrate that the SAVRY can be reliably scored. Intraclass correlations for the three risk domains and protective factors domain ranged from .85 to .91, indicating that each of these domains could be reliably determined. Similarly, interrater reliability scores for the SAVRY total score and final risk rating were both above .90 which indicates that both the total score and final risk rating can be established reliably. These results for interrater reliability are similar to those found by McEachran (2001), although results from the present study obtained slightly higher reliabilities for the risk domains and total score and a much higher reliability for the final risk ratings (.92 versus .72).

One possible explanation for the higher reliabilities found in this study is that the authors of the present study engaged in calibration during practice coding. This process involved further clarifying instructions for coding a few of the SAVRY items. This process is known to increase interrater reliability. However, it should be noted that the majority of items were very well operationally defined and did not require discussion. Further research is required to determine the extent to which calibration affects interrater reliability.

As expected, all of the SAVRY risk domains were moderately correlated with each other and most strongly correlated with the SAVRY total score. In terms of the relationship between risk domains and reoffending indices, all three risk domains were significantly correlated with any reoffending, violent reoffending, and mean number of new offenses with

the historical domain being most strongly correlated with these outcome measures. For mean time to new offense, higher scores on all three risk domains were correlated with decreased time to reoffend.

In terms of predictive validity, the SAVRY total score was analyzed according to a number of outcome measures, including any reoffending, violent reoffending, number of new offenses, and decreased time to reoffend. First, total scores on the SAVRY were significantly correlated with all of these reoffending indices. In addition, predictive validity of the SAVRY total score was strong regardless of gender or ethnicity. Secondly, results from ROC analyses indicated a strong relationship between the SAVRY total score and both general and violent reoffending. When compared to the YLS/CMI total score, results from ROC analyses found that the SAVRY total score was a better predictor of general and violent recidivism. The AUCs obtained using the YLS/CMI included .50 in the confidence interval for both general and violent recidivism, which raises the possibility that the YLS/CMI was not a statistically significant better predictor than chance (AUC = .50).

For the SAVRY, results from ROC analyses for violent recidivism (AUC = .77) were quite similar to those obtained by McEachran (2001) and Catchpole & Gretton (2003), who had AUCs of .70 and .73, respectively. In addition, AUCs for the three risk domains in the present study ranged from .65 to .76, indicating that all of the risk domains have moderate to strong ability to predict general and violent recidivism. Of the three risk domains, the historical domain produced the highest AUC and nearly matched that of the total score. This suggests that the historical factors included on the SAVRY may be most related to both general and violent recidivism. However, given the range of the confidence intervals, more research is necessary to substantiate this finding.

The ability of the SAVRY risk levels to determine violent and general recidivism was perhaps the most important research question addressed by this study. Results indicated that youths in the higher risk categories were at significantly greater risk for both general and violent reoffending. These results held regardless of gender or ethnicity. For violent reoffending, a “low” risk rating identified 38% of those who did not violently reoffend and a “high” risk rating identified 56% of those who did violently reoffend. In addition, only one out of the 36 (3%) youths defined as low risk on the SAVRY reoffended during the follow-up period, while 19 out of 34 (56%) youths defined as high risk reoffended violently. Taken together, these results indicate that a “low” risk rating does not detect the majority of those who will not reoffend violently but does identify a subgroup that is very unlikely to violently reoffend. By comparison, a “high” risk rating identifies the majority of those who will reoffend violently but also identifies a similar number who will not reoffend violently. Finally, 45% of the juvenile offenders fall in the moderate risk category and one-quarter of these youths will violently reoffend.

The utilization of structured clinical judgment versus the use of solely actuarial tools has been a source of controversy in risk assessment literature. Thus, the data were explored to determine if the SAVRY risk ratings produced results similar to those found using cut-off scores. Results indicated that the risk levels were found to encompass a range of scores with little overlap between categories. As well, the use of cut-off scores to determine risk level produced a very similar number of youths and rate of violent reoffending for each level when compared to results obtained using structured clinical judgment. These findings suggest that the SAVRY could perform well using either actuarial methods or structured clinical judgment to determine risk level. Further research is needed to replicate this finding.

Given that an aim of this study was to investigate the effects of gender and ethnicity on the predictive validity of the SAVRY, differences between males and females, and native and non-native youths, were investigated. No gender differences were found for age, ethnicity, seriousness of present offense, risk domain totals, or total score. Thus, males and females can be considered to be equivalent on these variables. In addition, results of the present study provide evidence that the SAVRY is valid when used with both males and females given that the SAVRY total score and risk rating were predictive of violent reoffending regardless of gender.

In terms of ethnicity, no differences between native and non-native youths were found for age, gender, or seriousness of present offense. However, native youths had significantly higher scores than non-native individuals for the Historical Domain, Social Domain, and total score. This indicates that the native youths may have represented a more serious group of offenders. Also, native youths were found to be more likely than non-native youths to violently reoffend. Thus, the higher SAVRY total scores for native youths likely reflect the higher risk of violent reoffending for this group. Despite this finding, the SAVRY total score and risk rating were predictive of violent reoffending for both native and non-native youths. Overall, the SAVRY maintains its predictive validity across gender and ethnic categories, but future research may identify risk factors that may operate differently according to gender or ethnicity.

Overall, the results from the present study indicate that the SAVRY is able to significantly discriminate between those who will and will not recidivate violently. However, a number of limitations of this study should be noted. First, a relatively small sample of select juvenile offenders was used. These youths were referred for a multidisciplinary assessment, likely due to concerns about the presence of psychological problems,

tendency for violence, and/or co-occurring problem behaviours. As a result, they may represent a subgroup of more serious juvenile offenders within the population of all youths who commit criminal offenses. Moreover, this study only provides information regarding the use of the SAVRY with youths who have already entered youth criminal justice system. It is uncertain whether or not similar results could be obtained with youths who have not yet incurred a previous criminal conviction.

Other limitations surround the recidivism outcome measures that were used.

Recidivism data consisted of criminal records and these records do not provide information on crimes that were unreported or did not result in a criminal charge or conviction. In fact, research has found that official records underestimate the number of crimes committed (Cook & Laub, 1998; Snyder & Sickmund, 1999). A more sensitive and accurate outcome measure would likely improve the performance of the SAVRY in a predictive validity analysis. In addition, the number and severity of violent reoffenses were unavailable. Clearly, an offender who commits only minor assaults poses less of a risk to public safety than does an offender who commits more serious violent crimes such as rape and murder. As well, repeat offenders often represent a more seriously disturbed subgroup of youth offenders. Future studies may choose to investigate the number and type of violent reoffenses in order to determine if the SAVRY is effective in identifying youths who commit ongoing, serious violent reoffenses. Furthermore, given that the base rate of violent reoffending in this sample was 26.7%, it may be beneficial to increase overall sample size in future studies to increase the number of violent reoffenders who can be analyzed.

Another methodological consideration in this study is that the SAVRY was coded retrospectively based on file review. For the coding of some items, such as stress and poor coping, lack of social support, community disorganization, and low empathy/remorse, little

information was available. Prior court-mandated assessments were not conducted with the goal of gathering information for the SAVRY items. Thus, it may be beneficial to employ a prospective research design which would utilize interviews and assessment tools intended to provide information for completion of the SAVRY. Finally, results from the SAVRY were used to assess risk for a follow-up period greater than one year although many of the SAVRY items, especially those in the social and individual domains, refer to factors occurring in the past six months or year. One of the strengths of the SAVRY is its inclusion of these dynamic risk factors which are associated with violence risk. However, more research could be conducted to determine how changeable these factors are over the course of adolescence and how exactly changes in these dynamic risk factors affect violence risk.

Regardless of the limitations of this study, the SAVRY was found to possess sound reliability and good predictive validity in the assessment of violence risk. The results of this study are comparable to those found by past research and provide evidence that the SAVRY maintains its predictive validity for follow-up periods beyond one year. In addition, this study provides evidence that the SAVRY can be used validly with females and native individuals, two groups which have not been adequately sampled in past published studies. As well, the predictive validity of the SAVRY with adolescents has been found to be quite similar to the predictive validity for adult assessment tools such as the HCR-20 (Webster et al., 1997), and the Violence Risk Assessment Guide (VRAG; Quinsey et al., 1998).

All of these findings add to the growing body of research that supports the use of the SAVRY to assess violence risk in adolescents. Future research may choose to replicate past studies using different populations in order to further substantiate the use of the SAVRY use with female offenders and different ethnic populations. In addition, the age of

the offender could be more fully analyzed to explore whether or not the SAVRY performs better with older versus younger adolescents. Furthermore, it would be valuable to better understand the structure of the SAVRY and how individual items in the SAVRY relate to outcome. This information could be used to refine the SAVRY to further improve its predictive validity.

Violence risk assessment for adolescents is an emergent research area with great potential for clinical application. Identifying offenders at risk for future violent offenses is the first step in developing appropriate and effective management and intervention strategies for juvenile offenders. The SAVRY represents a positive contribution to the field of risk assessment as it has been found to possess sound reliability and predictive validity in the assessment of violence risk in juvenile offenders. In addition, the SAVRY assists in the management of adolescent offenders by identifying dynamic risk factors as areas for risk reduction. Overall, the results of this study add to the growing body of research that the field of risk assessment, though challenging and complex, is improving through the innovation, analysis, and refinement of empirically grounded assessment tools.



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Appendix A  
Ethical Approval from Lakehead University

**Appendix B**  
**Ethical Approval from Lakehead Regional Family Centre**



Table 1

*Items in the Structured Assessment for Violence Risk in Youth (SAVRY)*

Domain	Item
Historical	History of Violence History of Non-Violent Offending Early Initiation of Violence Past Supervision/Intervention Failures History of Self-Harm or Suicide Attempts Exposure to Violence in the Home Childhood History of Maltreatment Parental/Caregiver Criminality Early Caregiver Disruption Poor School Achievement
Social/Contextual	Peer Delinquency Peer Rejection Stress and Poor Coping Poor Parental Management Lack of Personal/Social Support Community Disorganization
Individual/Clinical	Negative Attitudes Risk Taking/Impulsivity Substance Use Difficulties Anger Management Problems Low Empathy/Remorse Attention Deficit/Hyperactivity Difficulties Poor Compliance Low Interest/Commitment to School
Protective Factors	Prosocial Involvement Strong Social Support Strong Attachments and Bonds Positive Attitude Towards Intervention and Authority Strong Commitment to School Resilient Personality Traits

Table 2

*Means and Standard Deviations for SAVRY Domain Totals, Protective Factors Total, and Total Score by Gender and Total Sample*

	Total (N = 127)	Males (n = 80)	Females (n = 47)
Historical Domain	7.76 (4.04)	7.50 (4.09)	8.19 (3.97)
Social Domain	5.39 (2.43)	5.09 (2.54)	5.89 (2.17)
Individual Domain	8.71 (3.83)	8.51 (4.11)	9.04 (3.34)
Protective Factors	1.37 (1.59)	1.36 (1.48)	1.38 (1.79)
SAVRY Total Score	21.85 (8.59)	21.10 (9.23)	23.13 (7.31)

*Note:* Standard deviation in parentheses

Table 3

*Descriptive Statistics for Any Reoffense, Violent Reoffense, Number of New Offenses, and Mean Time to New Offense by Gender, Ethnicity, and Total Sample*

	Total (N = 127)	Males (n = 80)	Females (n = 47)	Native (n = 39)	Non-native (n = 88)
Any Reoffense (%)	46.5	51.3	38.3	53.8	43.2
Violent Reoffense (%)	26.8	32.5	17.0	43.6	19.3
Mean Number of New Offenses	1.7	2.1	1.3	2.6	1.4
Mean Time to New Offense	21.4	21.7	20.9	17.3	23.1

Table 4

*Correlations between SAVRY Domain Totals, Protective Factors Total, and Total Score*

	Historical Domain	Social Domain	Individual Domain	Protective Factors	SAVRY Total Score
Total Score					
Historical Domain	1.00				
Social Domain	.56	1.00			
Individual Domain	.50	.56	1.00		
Protective Factors	-.45	-.65	-.61	1.00	
SAVRY Total Score	.85	.80	.84	-.67	1.00

*Note:* All correlations significant at .01 level (2-tailed). \*Total N = 127

Table 5

*Correlations between SAVRY Domain Totals and Reoffending Indices*

	Historical Domain	Social Domain	Individual Domain
Any Reoffense	.42	.25	.37
Violent Reoffense	.43	.23	.31
Mean Number of New Offenses	.36	.27	.32
Mean Time to New Offense (months)	-.29	-.35	-.33

*Note:* All correlations significant at .01 level (2-tailed). \*Total N = 127

Table 6

*Correlations Between SAVRY Total Score and Reoffending Indices by Gender, Ethnicity, and Total Sample*

	Total ( <i>N</i> = 127)	Males ( <i>n</i> = 80)	Females ( <i>n</i> = 47)	Native ( <i>n</i> = 39)	Non-native ( <i>n</i> = 88)
Any Reoffense	.43	.49	.39	.48	.40
Violent Reoffense	.40	.45	.39	.54	.28
Mean Number of New Offenses	.39	.41	.44	.44	.32
Mean Time to New Offense (months)	-.38	-.45	-.23	-.34	-.35

*Note:* All correlations significant at .01 level (2-tailed)

Table 7

*Areas Under Curves (AUCs) for SAVRY Domains and Total Score for Any and Violent Reoffending*

	AUC	SE	95% CI
<b>Any Reoffense</b>			
Historical Domain	.74	.04	.65 - .82
Social Domain	.65	.05	.56 - .75
Individual Domain	.71	.05	.62 - .80
SAVRY Total Score	.75	.04	.67 - .83
<b>Violent Reoffense</b>			
Historical Domain	.76	.05	.67 - .86
Social Domain	.66	.06	.55 - .77
Individual Domain	.70	.05	.60 - .80
SAVRY Total Score	.77	.05	.67 - .87

*Note: N = 127 for all analyses*

Table 8

*SAVRY Final Risk Levels and Reoffending Indices by Gender and Total Sample*

Risk Level	Low			Moderate			High		
	Total (N = 36)	Males (n = 25)	Females (n = 11)	Total (N = 57)	Males (n = 32)	Females (n = 25)	Total (N = 34)	Males (n = 23)	Females (n = 11)
Any Reoffense (%)	18.9	19.2	18.2	45.8	59.4	29.6	73.5	73.9	72.7
Violent Reoffense (%)	2.7	3.8	0.0	23.7	37.5	7.4	55.9	56.5	54.5
Mean Number of New Offenses	0.4	0.4	0.5	1.8	2.6	0.9	3.1	3.2	2.9
Mean Time to New Offense (months)	29.7	31.8	24.8	19.3	16.5	22.7	16.4	8.0	12.9



Table 9

*Number in Risk Level and Violent Reoffense Rate for Structured Clinical Ratings and Use of Cut-off Scores*

Risk Level	Low	Moderate	High
<b>Structured Clinical Ratings</b>			
Total Number in Risk Level	36	57	34
Violent Reoffense Rate (%)	~	25	56
<b>Cut-off Scores</b>			
Total Number in Risk Level	35	55	37
Violent Reoffense Rate (%)	6	28	54

*Note:* Use of cut-off score resulted in risk level determination of low (0 to 16), moderate (16.5 to 27.5), high (28 to 48). \*N = 127 for total number in risk level