Predictive Validity of the Structured Assessment of Violence Risk in Youth (SAVRY) among a Sample of Asian Canadian Youth on Probation

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This study presents new data and original findings comparing Asian Canadian and White Canadian youth. A prior study with a subsample of data from the larger project compared Indigenous and White youth (Muir et al., 2020). In addition, two studies from the larger project examined case planning forms (Viljoen, Cochrane, et al., 2019; Viljoen, Shaffer, et al., 2019).

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Abstract

Objective: Although past studies suggest that the Structured Assessment of Violence Risk in Youth (SAVRY; Borum et al., 2006) has moderate predictive validity, its predictive validity with Asian youth in Western countries is unknown. We therefore compared the SAVRY's predictive validity in a sample of Asian Canadian versus White Canadian youth. **Hypotheses:** Given that the SAVRY is normed on samples comprising mostly youth who are White, we expected its predictive validity for recidivism would be lower for Asian Canadians than White Canadians. **Method:** We examined youth probation officers' SAVRY assessments for 573 youth (445 White Canadians, 56 East/Southeast Asian Canadians, and 72 South Asian Canadians) on community supervision (i.e., probation) in a Canadian province. Youth were prospectively followed for an average of 1.97 years (*SD* = 0.56 years) to determine if they were subsequently charged with violent or non-violent offenses. **Results:** Asian Canadians scored significantly lower on Risk Total scores compared to White Canadians. Predictive validity for violent and non-violent recidivism fell in the medium to large range for East/Southeast Asian Canadians (AUCs = .69 to .89) and South Asian Canadians (AUCs = .64 to .83). In comparison, predictive validity for White Canadians was generally lower (AUCs = .63 to .77; small to large range). Risk Total scores and non-violent risk ratings significantly predicted non-violent recidivism better for East/Southeast Asian Canadians (AUCs = .89 and .87, respectively) than White Canadians (AUCs = .77 and .71, respectively). Despite few significant differences between Asian subgroups, predictive validity for non-violent risk ratings was significantly higher in East/Southeast Asian Canadians (AUC = .87) than South Asian Canadians (AUC = .64). **Conclusions:** The SAVRY may be a useful tool for predicting recidivism with Asian Canadians.

However, future research should examine the SAVRY's predictive validity for youth of Asian descent in different countries and contexts.

Keywords: SAVRY, risk assessment, predictive validity, recidivism, Asian Canadian

Public Significance Statement

This study suggests that youth probation officers are able to adequately predict violent and non-violent reoffending using the SAVRY with East, Southeast, and South Asian Canadian youth. As such, the SAVRY may be a good option for assessing the risk of reoffending in Asian Canadian youth.

Predictive Validity of the Structured Assessment of Violence Risk in Youth (SAVRY) among a Sample of Asian Canadian Youth on Probation

Risk assessment tools are often used to assess the risk of recidivism among youth and adults in the justice system. Particularly in Western countries, these tools are used to guide numerous legal decisions, such as what treatment services youth receive, and whether youth are detained prior to trial, transferred to adult court, and given a custodial placement following adjudication (Viljoen et al., 2010). Studies have found that risk assessment tools are more accurate in predicting reoffending than unstructured risk judgments (e.g., Hilterman et al., 2014). In addition, researchers and policymakers hypothesize that tools can help improve treatment-planning, reduce incarceration rates, and even reduce violence (see Viljoen & Vincent, 2020).

Despite the potential benefits of risk assessment tools, policymakers, legal scholars, and courts have expressed growing concerns that risk assessment tools may exacerbate racial and ethnic biases (Vincent & Viljoen, 2020; Shepherd & Lewis-Fernandez, 2016). For instance, Eric Holder (2014), a former U.S. attorney general, stated that risk assessment tools may "exacerbate unwarranted and unjust disparities that are already far too common in our criminal justice system and in our society" (p. 254; see also Booker & Schatz, 2018; Starr, 2014, 2015). Similar concerns have been raised in Canada. Recently, the Supreme Court of Canada ruled that federal correctional services are obligated to ensure that only appropriate and validated risk assessment tools are used with people who are Indigenous (*Ewert v. Canada*, 2018). In addition, a recent article in the Globe and Mail reported that Indigenous and Black Canadians are more likely than other groups to receive maximum risk scores upon federal prison entry, resulting in harsher restrictions and reduced access to rehabilitative services while in custody (Cardoso, 2020).

Although there are growing concerns about the validity and impact of risk assessments with diverse populations, the use of risk assessment tools with Asian populations, particularly those in Western countries, have rarely been examined. To help address this gap, the present study examined the predictive validity of the Structured Assessment of Violence Risk in Youth (SAVRY; Borum et al., 2006) with a sample of Asian Canadian youth.

SAVRY with Racial and Ethnic Minority Youth

The SAVRY is one of the most widely used and studied tools for assessing youths' risk of violence (Viljoen et al., 2010). It uses a structured professional judgment (SPJ) model. As such, rather than adding up total scores on the 24 risk factors and 6 protective factors that it includes, assessors use their discretion in making a final judgment about whether a youth poses a low, moderate, or high risk of future violence. A number of studies have found that the SAVRY significantly predicts recidivism among youth. For instance, a meta-analysis with over 25,000 participants found that the SAVRY demonstrated the highest predictive validity out of nine of the most frequently used youth and adult risk assessment tools (e.g., median area under the curve [AUC] = .71; Singh et al., 2011). Studies in Canada have also reported that the SAVRY is able to predict violent, non-violent, and any recidivism with medium to large effect sizes (e.g., Catchpole & Gretton, 2003; Meyers & Schmidt, 2008; Muir et al., 2020).

Although extant literature examining the SAVRY's predictive validity appears promising, it remains unclear whether it is similarly valid for people of color (Shepherd et al., 2013; Shepherd & Lewis-Fernandez, 2016). Predictive validity studies tend to use samples that consist primarily of participants who are White (Shepherd et al., 2013; Singh et al., 2011), and some initial studies suggest that the SAVRY's predictive validity may be lower for racial and ethnic minorities. For example, an Australian study found that the SAVRY had chance level

predictive validity for any and violent recidivism in Culturally and Linguistically Diverse youth (i.e., “African”, “Asian”, “Middle Eastern”, and “Pacific Islander/Maori” descent), while youth from English-Speaking Backgrounds showed good predictive validity (i.e., medium to large effect sizes; Shepherd et al., 2014). Further, one meta-analysis noted partial evidence that risk assessment tools tend to perform better for predominantly White samples (Singh et al., 2011).

Other studies suggest that the SAVRY’s predictive validity may be similar across racial and ethnic groups. For instance, a recent study in Canada found few statistically significant differences for any and violent recidivism in the SAVRY’s predictive validity for Indigenous and White Canadian youth (Muir et al., 2020). Similarly, in predicting any and non-violent recidivism, no significant differences for the SAVRY’s predictive validity were found between Black and White American youth in the United States (Perrault et al., 2017).

SAVRY with Youth of Asian Descent

Although some research has examined groups such as Black Americans who are involved with the justice system, individuals of Asian descent have largely been ignored (Johnson & Betsinger, 2009; Zhuo & Zhang, 2018). Two studies have examined the SAVRY’s predictive validity with Asian youth, both of which were conducted in Asian countries (Chu et al., 2016; Zhou et al., 2017). In Singapore, SAVRY Risk Total scores and Summary Risk Ratings predicted violent and any recidivism with small to large effect sizes (AUCs = .63 to .72; Chu et al., 2016), while Risk Total scores predicted violent recidivism with a medium effect size in China (AUC = .68; Zhou et al., 2017). Only one predictive validity study, which examined the Historical, Clinical, Risk Management-20 (HCR-20; Webster et al., 1997), an adult violence risk assessment tool, has focused on people of Asian descent in a Western sample (Fujii et al., 2005).

The lack of research on individuals of Asian descent in the Western criminal justice

literature may be partly due to contemporary stereotypes that people with Asian ancestry are "model minorities" who are socially and economically successful, hard-working, and law-abiding (Franklin & Fearn, 2015; Johnson & Betsinger, 2009; Zhuo & Zhang, 2018). Commonly referred to as the model minority myth, these stereotypes minimize the perceived risks and needs for individuals of Asian descent (Zhuo & Zhang, 2018). This lack of research may also be due to small sample sizes and poor reporting of race (Franklin & Fearn, 2015; Johnson & Betsinger, 2009). For instance, because Canadian criminal justice statistics generally do not break down numbers by race (Owusu-Bempah & Wortley, 2014), the exact proportion of Asian Canadian youth in the criminal justice system is unknown. Similarly, arrest statistics for Asian American youth are limited by availability and inconsistent definitions of "Asian" (National Research Council & Institute of Medicine, 2001; Zhuo & Zhang, 2018).

Risk assessment tools tend to reflect Western norms and may therefore fail to include risk factors that are relevant for racial and ethnic minorities (Shepherd & Lewis-Fernandez, 2016). As such, the SAVRY might not predict recidivism as strongly in Asian Canadians compared to White Canadians. Indeed, some research shows that acculturation (i.e., the process of change in one's culture and behaviors due to intercultural contact; Berry, 2019) towards individualistic cultures among Asian American youth is associated with increased delinquency and substance use (Le et al., 2009; Le & Stockdale, 2005). Youth of Asian descent who have immigrated to Western countries may adapt to Western cultures and languages more readily than their parents (Qin & Han, 2014), which may result in parent-child relationship strain and lead to tendencies to gravitate towards delinquent peers. Similarly, parental reluctance to allow their child to acculturate into the larger Western society could inhibit youths' ability to develop a positive self-identity, thereby increasing their risk of criminality (Besla et al., 2005).

Discrimination, including derogatory insults and harassment based on race (see Kiang & Bhattacharjee, 2016), may be an additional risk factor for youth of Asian descent. Despite the model minority myth, a study in the United States found that Asian American youth were more likely than Black and Hispanic American youth to be targets of racial/ethnic discrimination (Cooc & Gee, 2014). Males of Asian descent, for instance, may be stereotyped as being less masculine and as being "small and weak" (Lei, 2003, p. 173). Moreover, negative stereotypes such as Asian gang involvement exist as well (Hudson & Bramhall, 2005; Kwok, 2008). In general, racial discrimination has been found to be associated with negative outcomes such as depression, aggression, and delinquency (e.g., Borders & Liang, 2011; Tobler et al., 2013).

Not only might the SAVRY exclude certain factors that are relevant to youth of Asian descent, the strength of association between SAVRY risk factors and recidivism may also differ for youth who are Asian Canadian versus White Canadian (see Shepherd & Lewis-Fernandez, 2016). For instance, strict parenting (which is captured in the SAVRY item Poor Parental Management) tends to be strongly related to delinquency among youth in Western countries, but this association is weak among Asian youth in Asian countries (Agnew, 2015). As such, these items may diminish the predictive validity of the SAVRY among youth of Asian descent.

Asian Subgroups

Despite common assumptions, people with Asian ancestry do not make up a homogenous group. In Canada, the two largest groups of Asian immigrants are East Asians and South Asians, both of which make up 30% of all Asian immigrants in Canada (Statistics Canada, 2017b). South Asian Canadians consist largely of individuals with Indian, Pakistani, and Sri Lankan backgrounds, while East Asian Canadians consist mainly of individuals with Chinese, Korean, and Japanese backgrounds (Statistics Canada, 2017a).

Asian cultures share an emphasis on collectivism where the interests of the group are prioritized over that of individuals (Singelis et al., 1995; Triandis et al., 1988). Collectivism, however, also varies among different Asian cultures. For example, Liu (2016) noted that individuals who are Chinese tend to prioritize personal relationships (e.g., family, friends) and place limited importance on the community. On the other hand, individuals who are Indian may prioritize both their community and personal relationships (Liu, 2016; Somerville & Robinson, 2016). East Asian cultures are additionally influenced by the teachings of Confucius (Wang et al., 2005). Some prominent Confucian values include harmonious interdependent relationships, filial piety (e.g., gratitude and subordination to parents), social hierarchies, and the importance of maintaining face (Huey & Tilley, 2018; Wang et al., 2005; Yeh & Bedford, 2003).

While South and East Asians comprise the majority of Asian Canadian immigrants, Southeast Asian Canadians are a smaller group, comprising approximately 24% of Asian immigrants in Canada (Statistics Canada, 2017b). Southeast Asian Canadians largely consist of individuals with Filipino, Vietnamese, and Cambodian backgrounds (Statistics Canada, 2017a). Some Southeast Asians, such as Cambodians, come from war-torn countries and tend to experience higher levels of mental health needs and trauma compared to other Asian subgroups (Chheang & Connolly, 2018; Lee et al., 2015). However, Southeast Asians share some similarities with East Asians. For instance, Southeast Asians, including those from Vietnam, Thailand, Malaysia, and Singapore, also tend to be influenced by Confucianism (Huey & Tilley, 2018; Wang et al., 2005). Some Southeast Asians (e.g., Vietnamese) may also be more likely to be perceived as similar to East Asians due to phenotypic characteristics such as skin color (Suyemoto, 2002) and thus may have shared experiences that differ from South Asians. One example of this is evident in the rise of hate crimes directed towards individuals of East and

Southeast Asian descent during the COVID-19 pandemic (Gover et al., 2020).

Given this variability among the Asian subgroups, the SAVRY's predictive validity may differ between these groups. For instance, individuals from the Philippines and India (Southeast and South Asian) may be more proficient in English upon arrival in a Western country (Paik et al., 2014), which could lead to fewer acculturation gaps and relationship strains between parents and children, and in turn, a reduced tendency to gravitate towards delinquent peers.

The Present Study

Given the lack of research on the SAVRY's predictive validity with Asian youth in Western countries, we examined the predictive validity of the SAVRY with East, Southeast, and South Asian Canadian youth. In consideration of the diversity among the Asian subgroups, we examined South Asian Canadians separately from East and Southeast Asian Canadians. Although prior SAVRY research has mainly used file-based designs, wherein research assistants code the SAVRY based on archival data, we used a field-based prospective design where risk assessments were completed by youth probation officers (YPOs) in a real-world context.

We examined three research questions: (1) Are YPOs more likely to rate East/Southeast Asian Canadian and South Asian Canadian youth as a lower risk on the SAVRY compared to White Canadian youth? (2) What is the predictive validity of SAVRY Risk Total scores and Summary Risk Ratings for East/Southeast Asian Canadian and South Asian Canadian youth compared to White Canadian youth for violent and non-violent recidivism? (3) Does race moderate the relationship between SAVRY ratings and youths' length of time to first violent and non-violent reoffense? We hypothesized that YPOs' SAVRY Risk Total scores and Summary Risk Ratings would predict violent and non-violent recidivism for both Asian Canadian groups. However, we expected that predictive validity for Asian Canadian youth would be lower than for

White Canadian youth because Asian Canadians may have risk factors that are not captured in the SAVRY (e.g., acculturation) and certain SAVRY items (e.g., parental supervision) may not be as predictive for Asian Canadians. Further, we hypothesized that YPOs would rate Asian Canadian youth as lower risk than White Canadian youth due to the model minority myth.

In this study, we use the term "Asian Canadian" when discussing Asian youth in Canada rather than "Asian" because referring to an Asian Canadian youth as Asian "reinforces the idea that Asian [Canadians] are perpetual foreigners" (American Psychological Association [APA], 2019, p. 143). Similarly, when making comparisons with Asian Canadians, we use the term "White Canadian" to avoid equating the unmodified term (i.e., White) with being intrinsically Canadian. Consistent with the guidelines provided by the Committee on Ethnic Minority Affairs (APA, 2019), we used the term "White" rather than "Caucasian" given the term Caucasian was originally developed as part of a racial hierarchy in which those labelled Caucasian were considered superior (see Mukhopadhyay, 2008; Rambachan, 2018).

Method

Participants

The sample consisted of 573 youth (n = 445 White Canadians; n = 56 East/Southeast Asian Canadians; n = 72 South Asian Canadians) on probation in a Canadian province. Youth were aged 13 to 20 years at assessment (M_{age} = 16.67, SD = 1.38). Males made up 82.02% (n = 470) of the sample and there were significantly more males within the South Asian Canadian group than the White Canadian group (see Table 1). In total, 93.37% (n = 535) of youth had prior convictions and 53.23% (n = 305) had prior violent convictions. Compared to both Asian groups, White Canadians were significantly younger at first conviction, had more previous convictions, and a greater total number of convictions. White Canadians were also significantly younger at

assessment compared to South Asian Canadians. There were no significant differences between the Asian subgroups except that significantly more South Asian Canadians were born in Canada.

Procedure

Design. This study examined the SAVRY with a prospective field-based design. Specifically, the SAVRY was implemented throughout the province on November 1, 2012. Since then, YPOs have been mandated to use the SAVRY with youth placed on probation to guide service planning. In the present study, we examined the predictive validity of YPOs' real-world SAVRY assessments for Asian Canadian and White Canadian youth. To identify youths' race (as indicated by YPOs), research assistants examined all available information on youths' probation files. This included information such as pre-sentence reports written by YPOs that included racial identification of youth and/or their biological parents, and any completed racial category fields located on youths' probation profiles, on service plans, and on referral forms.

Sampling of Asian Canadian Youth. Our sample of Asian Canadian youth was drawn from two sources: (1) previously collected provincial data, and (2) newly collected provincial data. Previous data came from a larger project in which we examined case plans for youth on probation (Viljoen, Cochrane, et al., 2019; Viljoen, Shaffer, et al., 2019) and the predictive validity of YPOs' SAVRY assessments for Indigenous youth (Muir et al., 2020). To generate the sample for this larger project, the provincial youth justice authority provided lists of all youth on probation in the province for two time periods (November 2, 2012 to April 7, 2014, and April 30, 2015 to November 15, 2015) and youth were randomly sampled from these lists. However, even though the overall sample size from previous data was large (n = 921), we were unable to examine the SAVRY's predictive validity for Asian Canadian youth due to the small sample sizes for East and/or Southeast Asian Canadians (n = 39) and South Asian Canadians (n = 47).

Thus, to achieve adequate power to compare predictive validity for Asian Canadians versus White Canadians, we collected new data to increase the sample size of Asian Canadian youth. Procedures to gather new data were similar to those used for the larger project. Specifically, the youth justice authority provided a list of youth on probation throughout the province from between November 1, 2017 and March 31, 2018. YPOs completed SAVRY assessments for 633 youth on probation during this time period. Given that only 9.34% of our original sample consisted of Asian Canadian youth, our goal was to oversample youth who are East/Southeast and South Asian Canadian from this new list. As the list did not contain racial information, we examined surnames for each youth as an initial step to screen in youth who were potentially of Asian descent. Studies suggest that surnames may be a reasonable indicator of race given that many individuals of Asian ancestry have surnames that are specific to particular Asian groups (e.g., Chinese surname "Wong"; Lauderdale & Kestenbaum, 2002; Sasao, 1994; Shah et al., 2010). From this initial step, we screened in 58 youth that were potentially Asian Canadian. Next, we reviewed all racial information located on youths' probation files (e.g., pre-sentence reports) for these 58 youth. Through this review, we confirmed that 42 youth were identified by YPOs as being East/Southeast Asian Canadian (n = 17) and South Asian Canadian (n = 25), and they were therefore included in data collection. Participant screening and data collection for new data was performed by one trained undergraduate research assistant of East Asian descent. By combining previous and new data, this resulted in a final sample of 56 East/Southeast Asian Canadians and 72 South Asian Canadians.

Although South Asian Canadians were clearly identified by YPOs (e.g., Indian, South Asian), YPOs did not always provide the necessary information to differentiate East and Southeast Asian Canadians. Racial identification varied in quality from simply identifying an

East/Southeast Asian youth as "Asian" to more specific descriptions such as "Korean" (East Asian) or "Vietnamese" (Southeast Asian). Ultimately, 9 youth were explicitly identified as East Asian (16.07%; e.g., Chinese), 6 youth as Southeast Asian (10.71%; e.g., Filipino), and one youth as both East and Southeast Asian (1.79%; e.g., Chinese and Filipino). The remaining 40 youth (71.43%) within the East/Southeast Asian subgroup were not clearly identified as being East and/or Southeast Asian Canadian. As such, consistent with other research (e.g., Kwok, 2008; Lee et al., 2017), East and Southeast Asian subgroups were examined together.

Given that people of Asian descent who are biracial and multiracial often experience racial minority status and face similar experiences of discrimination and stereotyping as that of monoracial individuals (see Mckie, 2018; Milville et al., 2005), we included biracial and multiracial Asian Canadians within our Asian subgroups rather than classifying them as White Canadians or excluding them from the study. Specifically, 11 youth (19.64%) within the East/Southeast Asian group were biracial or multiracial, while 2 youth (2.78%) within the South Asian group were biracial. This approach is consistent with other predictive validity research with biracial and multiracial youth (Muir et al., 2020).

Sampling of White Canadian Youth. White Canadian youth (i.e., both parents are White Canadian) were included as a comparison group (n = 445) because risk assessment tools, such as the SAVRY, are developed and calibrated primarily based on Western perspectives and White participants (Shepherd & Willis-Esqueda, 2018). All youth from the White Canadian group were drawn from previous data collection (i.e., random sample of youth on probation between November 2, 2012 to April 7, 2014, and April 30, 2015 to November 15, 2015). Given that the SAVRY's predictive validity for Indigenous youth (n = 296) was examined in a separate study (Muir et al., 2020), those data were not presented again here. Youth belonging to other

racial and ethnic groups (23 Black Canadians, 20 Latinx Canadians, 27 Other) were not examined due to small sample sizes.

Coding Procedures. Research assistants (RAs) extracted and recorded YPOs' SAVRY assessments for each youth from the province's youth justice database. Data collection was completed by seven trained RAs (one graduate and six undergraduates). RAs also coded demographic information, offense histories, and recidivism data. Prior to collecting data, all RAs attended a half-day course and were trained to use the youth justice database by a certified instructor. The interrater reliability for RAs' recording of SAVRY assessments were examined for 88 cases where two RAs were randomly assigned to record SAVRYs for the same file. RAs' extraction of YPOs' SAVRY Risk Total, domain scores, and Summary Risk Ratings showed perfect interrater reliability (intraclass correlation coefficient [ICC] = 1.00; Cicchetti, 1994).

Interrater Reliability and Missing Data. As this was a real-world field study, it was not possible to gather interrater reliability data for YPOs' SAVRY assessments for the specific cases included in the present study. However, prior to adopting the SAVRY, YPOs in the province attended a two-day SAVRY training course which included a practice case vignette. The interrater reliability for the practice case was good; the majority (87.70%, n = 107) of SAVRY Risk Total scores were in close range (i.e., within four points) to the answer key which was developed by a SAVRY co-author (Dr. Patrick Bartel) and our research team. Missing data on the SAVRY was rare. In 573 of the 574 cases, no SAVRY items were missing. The one remaining case was missing over 40% of SAVRY items and was thus excluded. In addition, 20 youth were excluded because their files did not contain sufficient information to code their race. No cases were missing recidivism data. Three duplicate cases, where youth had been placed on probation multiple times, were eliminated to prevent counting youth twice in the sample.

Measures

Structured Assessment of Violence Risk in Youth (SAVRY; Borum et al., 2006). The SAVRY is a structured professional judgment risk assessment tool used to assess violence risk in youth aged 12 to 18. It contains 24 risk factors rated Low, Moderate or High, and six protective factors (e.g., Strong Social Support) rated Absent or Present. Risk factors are organized into three domains, with 10 Historical items (e.g., Childhood History of Maltreatment), six Social/Contextual items (e.g., Peer Rejection), and eight Individual/Clinical items (e.g., Risk Taking/Impulsivity). At the assessor's discretion, the items are used to guide a Summary Risk Rating of Low, Moderate or High risk of recidivism. For research purposes, risk items are also commonly summed (Low = 0, Moderate = 1, and High = 2) to derive a Risk Total score. Based on prior studies, the SAVRY has good to excellent interrater reliability (ICC = .72 to .97), high internal consistency (Cronbach's alpha = .82 to .90), good predictive validity (AUC = .74 to .80), and there is evidence of concurrent validity with correlations between .58 and .89 with another commonly used adolescent risk assessment tool, the Youth Level of Service/Case Management Inventory (YLS/CMI; Hoge & Andrews, 2002; Borum et al., 2010).

Recidivism. Provincial justice records were used to determine if a youth was charged with new violent or non-violent offenses following their SAVRY assessment. Violent and non-violent recidivism were examined separately. Violent recidivism was defined as "actual, attempted, or threatened infliction of bodily harm of another person" (Douglas et al., 2013, pp. 36-37) and included offenses such as assault, uttering threats, and sexual assault. Non-violent recidivism included offenses such as theft, possession of weapons, and failure to comply. Recidivism data captured both offenses committed as a youth and as an adult (i.e., ages 18 and above). Time to first violent and non-violent reoffense after the SAVRY assessment was also

calculated. The average follow-up period (i.e., time between the SAVRY and data collection) was 1.97 years (*SD* = 0.56 years, range = 0.38 to 3.35 years). The follow-up period for South Asian Canadians (*M* = 1.89 years, *SD* = 0.72 years) did not differ from youth in other groups. However, the average follow-up for White Canadian youth (*M* = 2.00 years, *SD* = 0.51 years) was approximately 80 days longer than for East/Southeast Asian Canadian youth (*M* = 1.78 years, *SD* = 0.60 years), $t(65.62) = 2.68$, $p = .009$. None of the youth were incarcerated over the entire duration of their follow-up periods and as such, all youth had an opportunity to reoffend.

Recidivism rates were 15.36% and 33.86% for violent and non-violent offending, respectively. No significant differences in recidivism rates among the groups were present (see Table 1). These recidivism rates are slightly lower than meta-analytic findings including youth justice samples with varying follow-up lengths from around the world (e.g., Olver et al., 2009), but comparable to studies including Canadian youth probation samples with similar follow-up periods and measures of recidivism (e.g., official charges; Jones et al., 2016).

Ethics

The Office of Research Ethics at Simon Fraser University provided ethics approval for the present study. We conducted this study in accordance with ethical guidelines for data collection (APA, 2017; Canadian Institutes of Health Research [CIHR], Natural Sciences and Engineering Research Council of Canada [NSERC], & Social Sciences and Humanities Research Council of Canada [SSHRC], 2018; Canadian Psychological Association [CPA], 2017), and with reporting guidelines for predictive validity studies (Singh et al., 2015).

Results

Data Analytic Plan

Statistical analyses were conducted on IBM SPSS Statistics Version 25.0.

Group Comparisons of SAVRY Ratings. Based on an examination of Q-Q plots, skew and kurtosis, and Shapiro-Wilk normality tests, SAVRY Risk Total and domain scores were not normally distributed. As such, Mann-Whitney U tests (Mann & Whitney, 1947), a non-parametric test, were used to compare Asian and White Canadians on these variables. To test if Asian Canadians were less likely to be rated as High risk, we conducted Chi-square analyses.

Predictive Validity. Receiver operating characteristic (ROC) analyses were used to examine how well SAVRY ratings discriminated between recidivists and non-recidivists. AUCs are calculated from the area under the ROC curve, which is a function of true positive rates (i.e., sensitivity) and false positive rates (i.e., 1-specificity; Cook, 2007). AUCs represent the likelihood that a randomly selected recidivist would have a higher SAVRY rating than a randomly selected non-recidivist (Hanley & McNeil, 1982). AUC effect sizes were interpreted as small (.556), medium (.639), or large (.714; Rice & Harris, 2005). Hanley and McNeil's (1982) test for detecting differences between AUCs were used between the groups (Lowry, n.d.).

Sensitivity (i.e., proportion of recidivists with High risk ratings) and specificity (i.e., proportion of non-recidivists with Low risk ratings; Singh, 2013) were calculated to examine group differences in proportions of correctly identified recidivists and non-recidivists. Positive predictive values (PPVs; i.e., proportion of youth with High risk ratings that went on to reoffend), negative predictive values (NPVs; i.e., proportion of youth with Low risk ratings that did not reoffend), false positives (i.e., proportion of youth with High risk ratings that did not reoffend), and false negatives (i.e., proportion of youth with Low risk ratings that went on to reoffend) were also calculated. These analyses tested whether YPOs were more likely to underestimate risk for Asian Canadian versus White Canadian youth. Consistent with other research, these analyses excluded youth with Moderate risk ratings as it was unclear whether to

group them with Low risk or High risk youth (Muir et al., 2020).

Time to First Reoffense and Racial Moderation. Cox proportional hazard regressions (i.e., Cox regression; Cox, 1972) were used to examine whether SAVRY Risk Total scores and Summary Risk Ratings predicted youths' time to reoffend violently and non-violently, while controlling for differences in follow-up length. In the first block, SAVRY ratings and racial groups were entered as covariates. Their interaction term was included in the second block to examine whether race moderated the relationship between SAVRY ratings and time to first reoffense. Time to first reoffense (i.e., survival time) was calculated from between the dates of the first reoffense and the SAVRY assessment. Survival time for non-recidivists were calculated from the dates of the follow-up and assessment.

Power. A priori power analyses showed adequate power to detect large (d = .80) and medium (d = .50) group differences in SAVRY Risk Total scores (power = .93 to 1.00; Cohen, 1992). The required sample sizes for testing the SAVRY's predictive validity was calculated based on Peduzzi et al.'s (1996) guidelines: $N = 10\ k/p$, where k is the number of independent variables and p is the proportion of youth expected to reoffend. Excluding East/Southeast Asian Canadians (n = 56), power was adequate for examining predictive validity for separate groups. However, power for detecting interaction effects was more limited, as it requires the sample size to be four-fold of what is needed for detecting main effects (Weinberg, 2009).

SAVRY Ratings and Group Differences

Compared to White Canadians, both Asian Canadian subgroups had significantly lower SAVRY Risk Total, Historical, and Individual/Clinical risk scores (see Table 2). In addition, South Asian Canadians were significantly less likely than White Canadians to be rated as High risk for non-violent recidivism (see Figure 1 and 2). No significant differences arose between the

Asian Canadian subgroups. Post hoc Chi-square analyses were conducted to test whether Asian Canadians were less likely to receive High ratings on particular SAVRY items compared to White Canadians. Similar to Shepherd et al. (2014), we dichotomized item ratings by High and Moderate/Low. Both Asian Canadian subgroups were significantly less likely to be rated High risk for nearly one-third of the risk items (see Table 3). With the Protective domain, both Asian Canadian subgroups were significantly more likely to have a Strong Commitment to School, and East/Southeast Asian Canadians were also more likely to have Prosocial Involvement.

Predictive Validity

ROC. In general, SAVRY Risk Total and domain scores predicted violent and non-violent recidivism with large effect sizes (i.e., above .714; Rice & Harris, 2005) for both Asian Canadian subgroups (see Table 4). Although AUCs for White Canadian youth were significant, they were somewhat lower than those for Asian Canadian youth. Nevertheless, most of the group differences in AUCs did not reach statistical significance (i.e., $p < .05$). There were, however, five exceptions for non-violent recidivism. Compared to White Canadians, East/Southeast Asian Canadians had significantly higher AUCs for Risk Total scores, Historical risk scores, Individual/Clinical risk scores, and non-violent risk ratings. East/Southeast Asian Canadians also had a significantly higher AUC for non-violent risk ratings compared to South Asian Canadians.

Sensitivity and Specificity. The sensitivity and specificity of YPOs' risk ratings were higher in East/Southeast Asian Canadians than White Canadians for both violent and non-violent recidivism (see Table 5). In other words, more East/Southeast Asian Canadians were correctly identified as High risk (i.e., sensitivity) and as Low risk (i.e., specificity) compared to White Canadians for violent and non-violent recidivism. The patterns for South Asian Canadian youth were slightly different. Compared to White Canadians, fewer South Asian Canadians were

correctly identified as High risk for non-violent recidivism and as Low risk for violent recidivism. Excluding High violent risk ratings, the sensitivity and specificity of YPOs' risk ratings were also lower in South Asian Canadians than East/Southeast Asian Canadians.

PPVs and NPVs. For violent recidivism, PPVs and NPVs were higher for youth in both of the Asian Canadian subgroups than for White Canadian youth (see Table 5). Thus, a greater proportion of White Canadians with High violent risk ratings did not reoffend violently (i.e. false positives), and more White Canadians with Low violent risk ratings went on to commit a violent offense (i.e., false negatives). In contrast, for non-violent recidivism, PPVs and NPVs were the highest only for East/Southeast Asian Canadians compared to South Asian and White Canadians.

Time to First Reoffense and Racial Moderation

SAVRY Risk Total scores and Summary Risk Ratings significantly predicted time to first violent and non-violent reoffense (see Tables 6 and 7). In three of the four analyses, race did not significantly moderate these associations. In other words, Risk Total scores and Summary Risk Ratings predicted recidivism regardless of youths' race. However, in one analysis, a significant moderation effect was observed for non-violent risk ratings, $\chi^2(2) = 8.15$, $p = .017$. Specifically, non-violent risk ratings were significantly better at predicting time to first non-violent reoffense in South Asian Canadian youth compared to White Canadian youth.

Discussion

Few studies have examined the SAVRY's predictive validity with Asian youth, and to our knowledge, no study has focused on youth of Asian descent in the Western justice system. Thus, we examined the predictive validity of YPOs' SAVRY assessments for East/Southeast Asian Canadian and South Asian Canadian youth compared to White Canadian youth.

Primary Findings

As hypothesized, East/Southeast Asian Canadians and South Asian Canadians scored significantly lower than White Canadians on Risk Total, Historical risk, and Individual/Clinical risk scores. However, even though YPOs rated Asian Canadian youth as lower risk, they were not significantly less likely than White Canadian youth to reoffend. As such, it is possible that YPOs may sometimes rate Asian Canadians as lower risk than warranted due to contemporary perceptions and myths about individuals of Asian descent. For instance, consistent with the model minority myth, YPOs rated Asian Canadians as showing better school achievement and commitment to school than White Canadians. The lower risk scores for Asian Canadian youth could be due, in part, to a cultural emphasis on family privacy (Lee et al., 2017). For instance, East, Southeast, and South Asian families might be less likely to disclose negative information, such as a history of child maltreatment (Lee et al., 2017; Ragavan et al., 2018).

However, even if these factors may have led to attenuated risk scores for Asian Canadians, the SAVRY nevertheless showed strong predictive validity for the Asian subgroups. Contrary to our hypothesis, SAVRY Risk Total and Summary Risk Ratings for East/Southeast and South Asian Canadian youth generally fell in the medium to large range and there was a pattern towards higher predictive validity for Asian Canadian versus White Canadian youth. Further, South Asian Canadians with higher non-violent ratings reoffended sooner than White Canadians. Thus, overall, YPOs were better at identifying which Asian Canadian youth would reoffend than they were for White Canadian youth. Although the reasons for this finding are unclear, the SAVRY may be picking up on cues that are especially salient for reoffending in Asian Canadian youth. For instance, although cultural factors such as high individualism are associated with delinquency among Asian American youth, peer delinquency (i.e., an item on the SAVRY) is a partial mediator between this association and it remains one of the strongest

predictors of delinquency among youth of Asian descent (Le & Stockdale, 2005).

In addition, much like Canada's multicultural population (Statistics Canada, 2013), YPOs within the province had diverse backgrounds and included those who are Asian Canadian. Although we did not examine the racial/ethnic background of YPOs, it is possible that the YPOs in our sample may have been particularly sensitive to diverse cultural norms (e.g., body language; Shepherd & Lewis-Fernandez, 2016), and thus better able to build rapport and interview Asian Canadian youth to elicit relevant information. A recent American study found that SAVRY risk scores did not differ based on whether youths' race/ethnicity matched their YPOs' (Munoz et al., 2020); however, it is not known if this has an impact on predictive validity.

Furthermore, our predictive validity results were somewhat stronger than previous SAVRY research with Asian youth in Singapore (Chu et al., 2016) and in China (Zhou et al., 2017). For predicting violent recidivism, AUC values for SAVRY Risk Total scores and Summary Risk Ratings fell within the small to medium range for youth in Singapore and China, while in our study, these AUCs for East/Southeast Asian Canadian youth fell in the large range.

Although we hypothesized that YPOs would be more likely to incorrectly rate Asian Canadian youth as Low risk, indicating an underestimation of risk, this hypothesis was not supported. For instance, nearly all the Asian Canadians that YPOs rated as Low risk for violent recidivism did not commit a violent offense. Thus, even if the general public or YPOs hold stereotypes that Asian Canadian youth may be less likely to reoffend given the model minority myth, the use of the SAVRY might help to counteract these stereotypes by providing a standardized structure for evaluating risk.

In general, the SAVRY's predictive validity was similar for East/Southeast and South Asian Canadians. When the AUCs for these groups were compared, only one of the twelve

comparisons reached significance. Specifically, non-violent Summary Risk Ratings were significantly higher in East/Southeast Asian Canadians. In addition, for predictions of non-violent recidivism, NPVs (i.e., rated as Low risk and did not reoffend) and PPVs (i.e., rated as High risk and went on to reoffend) were higher for East/Southeast Asian Canadians than for South Asian Canadians. However, as NPVs and PPVs are dependent on recidivism base rates (Singh, 2013), it is unclear if these findings would be replicated in other studies and it will be important to test whether results vary with Asian Canadian samples that have higher base rates.

Limitations

One limitation of the present study is that we were unable to examine the differences between East and Southeast Asian Canadians. Although there are some similarities between East and Southeast Asian Canadians which justify combining them (Huey & Tilley, 2018), there are also differences, such as in languages spoken, common reasons for immigration, and mental health needs (Lee et al., 2015; Paik et al., 2014). For instance, although Asian Americans have been found to exhibit lower levels of mental health needs compared to other racial and ethnic groups, research has reported that Southeast Asian Americans have more mental health difficulties compared to East and South Asian Americans (Lee et al., 2015).

In addition, although our sample sizes for the Asian subgroups are larger than prior studies that have included youth of Asian descent outside of Asian countries (e.g., Catchpole & Gretton, 2003), the sample sizes were still relatively small. As such, our power to detect significant group differences was limited. For instance, although the AUCs for SAVRY scores and risk ratings were higher for Asian Canadian youth than White Canadian youth with 22 out of the 24 comparisons, only 18% of these findings were statistically significant. It is possible that with a larger sample size, a greater proportion of these results may have reached significance.

Moreover, like other SAVRY predictive validity studies, we measured recidivism using official justice records (e.g., Catchpole & Gretton, 2003; Chu et al., 2016). We used charges rather than convictions because charges may be a more sensitive measure of recidivism (Muir et al., 2020). However, official justice records can be influenced by racial biases in the justice system (see Vincent & Viljoen, 2020). For instance, it is possible that, due to the model minority myth, Asian Canadians are policed less heavily than other groups. Thus, future research should test whether our results remain comparable when recidivism is measured using self-report.

Implications for Practice

Based on the results of this study, the SAVRY appears to be a reasonable instrument to use for assessing recidivism risk among East, Southeast, and South Asian Canadian youth. However, despite results showing good predictive validity for Asian Canadian youth in general, this does not necessarily indicate that the distal causes for the SAVRY's risk factors are the same among and within East Asian, Southeast Asian, South Asian, and White Canadian youth. There may be unique racial, ethnic, and cultural risk factors that result in the risk items that are subsequently captured within the SAVRY. For instance, with a Cambodian Canadian youth, the experience of being a refugee from a war-torn country may result in a High rating for Stress and Poor Coping directly as a result from trauma (Chheang & Connolly, 2018). As such, in developing case formulations, it is important for assessors to try to identify the root causes of risk factors to allow for more effective intervention plans (Hart et al., 2011).

Further, to help ensure that risk assessments do not inadvertently lead to "indirect discrimination" (Hudson & Bramhall, 2005, p. 737), assessors should remain vigilant of stereotypes that they might hold and work to counteract them. If assessors incorrectly assume that Asian Canadians are low risk due to the model minority myth, youth may not receive the

supervision and interventions they need. Alternatively, if assessors inaccurately overestimate risk for Asian Canadians as a result of stereotypes about Asian gang involvement, youth may receive unwarranted restrictions (e.g., custodial placements). Although the SAVRY's structured rating criteria might help assessors minimize the influence of stereotypes as compared to unstructured judgments, research has yet to directly test this possibility. Further, professionals with limited cultural knowledge may still introduce biases while using assessment tools (Shepherd, 2016).

Thus, as recommended by Choi and Severson (2009), professionals who work with individuals of Asian descent must aim to increase cultural competency through education about cultural differences that depart from Western norms. Cross-cultural training may help to reduce stereotypes and promote more inclusive environments. For instance, involvement with crime is viewed as shameful among many Asian families, and parents may blame their child's offending on parental failure (Bedford & Hwang, 2003; Zhang, 1995). Given that collectivist orientations are prevalent among Asian cultures, family cohesion is often paramount (Greenfield et al., 2003; Le & Stockdale, 2005). Consistent with recommended practices for adolescent risk assessments (see Viljoen et al., 2010), assessors should take steps to ensure that parents/guardians are actively involved during interviews with youth justice professionals. This may include the use of interpreters for those who are not proficient in English (Choi & Severson, 2009).

Future Research

Rather than assuming that individuals of Asian descent make up a single homogenous group, a key direction for future research will be to attend to the diversity within the Asian subgroups. For instance, rather than group East and Southeast Asian Canadian youth together, researchers should examine these groups separately or, better yet, compare youth with different self-identified nationalities or regions of origin (e.g., Korean Canadians), provided that sample

sizes are sufficient to do so. In addition, although many Asian Canadians were born in Canada and have lived there all their life, some youth may have immigrated recently. Thus, researchers should attempt to incorporate acculturation factors into research, as acculturation may be an additional hurdle during adolescence for youth of Asian descent who reside in Western countries (Besla et al., 2005; Le & Stockdale, 2005). Prior studies have demonstrated that first-generation immigrants, who are less acculturated, are less likely to reoffend or report delinquent behaviors compared to second-generation immigrants (e.g., Bersani et al., 2013; Salas-Wright et al., 2016).

Whereas some studies suggest that the SAVRY can predict recidivism for females (e.g., Penney et al., 2010), it is unknown whether this is true for females of Asian descent. In this study, we were unable to examine gender differences because 10-13% of Asian Canadians were female. However, YPOs may be more likely to underestimate risk levels for Asian Canadian females than for males. Past research has suggested that adult sentencing decisions in the United States tend to be more lenient for Asian American females than males (Johnson & Betsinger, 2009). Moreover, many Asian cultures are patriarchal, and females are often expected to abide with more restrictive cultural customs (Sharma et al., 2020; Toor, 2009; Toyokawa & Toyakawa, 2013). While these expectations may be protective factors, it may also cause additional acculturative stress and give rise to unique risk factors that are not captured in the SAVRY.

Another direction for future research would be to examine YPOs' beliefs about the underlying causes of reoffending for Asian Canadian youth. For instance, on the SAVRY, assessors are permitted to flag certain items as critical factors that are thought to drive a youth's offending and act as an underlying mechanism. Researchers could test whether YPOs flag different types of items as critical factors for Asian Canadian versus White Canadian youth. Researchers could also conduct interviews with youth justice professionals to examine which

risk factors they view as responsible for leading to offending among Asian Canadian youth. Moreover, similar to Shepherd and Willis-Esqueda (2018) who examined Indigenous professionals' perspectives on the appropriateness of the SAVRY with Indigenous youth, researchers could also conduct interviews with Asian Canadian youth justice professionals regarding their perspectives on the use of the SAVRY with Asian Canadian youth.

Lastly, it is not known whether an assessor's own racial, ethnic, and cultural background has an impact on predictive validity. To investigate this, researchers could compare risk assessment results for youth who are assessed by YPOs of the same versus different racial, ethnic, and cultural background. For instance, are predictive validity results stronger for South Asian Canadian youth when SAVRYs are conducted by South Asian Canadian assessors rather than White Canadian assessors? Perhaps an assessor who shares the same background as the youth may be more culturally competent and better able to elicit relevant information (Shepherd & Lewis-Fernandez, 2016), which could potentially lead to more accurate risk assessments.

Conclusion

Even though risk assessment tools are widely used with diverse populations of youth throughout the world, limited research has investigated the predictive validity of these tools with youth of Asian descent. In this study, we found that the SAVRY is a promising tool to use with East, Southeast, and South Asian Canadians. In fact, contrary to expectations, the SAVRY showed somewhat stronger predictive validity in Asian Canadian youth than it did for White Canadian youth. Further research is needed to determine whether our findings generalize to other countries and contexts. As a next step, researchers need to delve deeper into understanding the underlying causes of offending among Asian Canadian youth and take steps to ensure that the risk assessments are conducted in a culturally informed and competent manner.

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Table 1

Demographics, Historical Offending, and Recidivism

	Groups			Differences								
	White (n = 445)	East/Southeast Asian (n = 56)	South Asian (n = 72)	White versus East/Southeast Asian			White versus South Asian			East/Southeast Asian versus South Asian		
Variables	*M (SD)*	*M (SD)*	*M (SD)*	*t*	*p*	*d* [95% CI]	*t*	*p*	*d* [95% CI]	*t*	*p*	*d* [95% CI]
Age at first conviction	15.89 (1.38)	16.42 (1.71)	16.58 (1.26)	-2.22	.030	.37 [.09, .65]	-3.96	<.001	.51 [.26, .76]	-0.58	.563	.11 [-.24, .46]
Age at SAVRY	16.57 (1.35)	16.95 (1.61)	17.08 (1.30)	-1.92	.055	.28 [-.003, .55]	-3.02	.003	.38 [.13, .63]	-0.53	.595	.09 [-.26, .44]
				U	*p*	*δ* [95% CI]	*U*	*p*	*δ* [95% CI]	*U*	*p*	*δ* [95% CI]
Total prior convictions	3.37 (3.92)	2.04 (2.84)	1.57 (1.99)	8157.00	<.001	-.63 [-.91, -.34]	9680.00	<.001	-.73 [-.99, -.47]	1951.50	.743	-.06 [-.41, .30]
	n (%)	*n (%)*	*n (%)*	χ^2	*p*	*r* [95% CI]	χ^2	*p*	*r* [95% CI]	χ^2	*p*	*r* [95% CI]
Male	357 (80.22)	49 (87.50)	64 (88.89)	1.71	.191	.06 [-.03, .15]	10.16	.006	.14 [.05, .22]	1.01	.604	.09 [-.08, .26]
Born in Canada [a]	438 (98.43)	34 (60.71)	65 (90.28)	117.90	<.001	.49 [.41, .55]	9.27	.002	.13 [.05, .22]	15.40	<.001	.35 [.18, .50]
English as first language [b]	438 (98.43)	24 (42.86)	39 (54.17)	190.12	<.001	.62 [.55, .68]	136.39	<.001	.51 [.44, .58]	1.78	.183	.12 [-.06, .28]
Any prior conviction	439 (98.65)	42 (75.00)	54 (75.00)	72.60	<.001	.38 [.30, .46]	78.32	<.001	.39 [.31, .46]	-	-	-
Violent prior conviction	245 (55.06)	27 (48.21)	33 (45.83)	0.97	.324	.04 [-.04, .13]	2.18	.140	.06 [-.02, .15]	0.07	.789	.02 [-.15, .19]
Any recidivism	168 (37.75)	19 (33.93)	21 (29.17)	0.31	.577	.02 [-.06, .11]	1.97	.160	.06 [-.02, .15]	0.33	.564	.05 [-.12, .22]
Violent recidivism	70 (15.73)	6 (10.71)	12 (16.67)	0.97	.324	.04 [-.04, .13]	0.04	.840	.01 [-.08, .09]	0.92	.337	.08 [-.09, .25]
Non-Violent recidivism	156 (35.06)	17 (30.36)	21 (29.17)	0.49	.486	.03 [-.06, .12]	0.96	.329	.04 [-.04, .13]	0.02	.884	.01 [-.16, .18]

Note. SAVRY = Structured Assessment of Violence Risk in Youth. CI = confidence interval. Missing n = 2 White Canadians, n = 1 East/Southeast Asian Canadian and n = 1 South Asian Canadian for age at first conviction. Missing n = 1 White Canadian for violent prior conviction. One South Asian Canadian youth identified as non-binary. Effect sizes for δ (Newcombe, 2006a, 2006b) and Cohen's d: small = .20, medium = .50, large = .80, and effect sizes for r: small = .10, medium = .30, large = .50 (Cohen, 1992).

[a] White Canadians born outside of Canada includes *n* = 1 Germany; *n* = 1 Scotland; *n* = 1 Serbia; *n* = 1 Ukraine; n = 3 unknown. East/Southeast Asian Canadians born outside of Canada includes *n* = 1 Australia; *n* = 1 Bahrain; *n* = 1 Burma; *n* = 8 China; *n* = 1 France; *n* = 1 Mongolia, *n* = 2 Philippines, *n* = 1 South Korea; *n* = 1 Vietnam; *n* = 5 unknown. South Asian Canadians born outside of Canada includes *n* = 1 England; *n* = 2 India; *n* = 1 Pakistan; *n* = 3 unknown.
[b] White Canadians who did not learn English as first language includes *n* = 1 German; *n* = 1 Russian; *n* = 5 unknown. East/Southeast Asian Canadians who did not learn English as first language includes *n* = 10 Cantonese/Mandarin; *n* = 1 Kirin; *n* = 2 Korean; *n* = 1 Mongolian; *n* = 2 Tagalog; *n* = 5 Vietnamese; *n* = 11 unknown. South Asian Canadians who did not learn English as first language includes *n* = 1 Arabic; *n* = 16 Punjabi; *n* = 2 Hindu; *n* = 1 Urdu; *n* = 13 unknown.

Table 2

Youth Probation Officers' SAVRY Scores and Summary Risk Ratings Rated as High

	Groups			Differences								
SAVRY Scores	White (n = 445)	East/Southeast Asian (n = 56)	South Asian (n = 72)	White versus East/Southeast Asian			White versus South Asian			East/Southeast Asian versus South Asian		
	M (SD)	*M (SD)*	*M (SD)*	*U*	*p*	δ [95% CI]	*U*	*p*	δ [95% CI]	*U*	*p*	δ [95% CI]
Historical	7.22 (4.10)	5.48 (4.01)	5.64 (3.95)	9258.50	.002	-.46 [-.74, -.17]	12160.50	.001	-.43 [-.69, -.17]	1962.00	.794	-.05 [-.41, .30]
Social/ Contextual	4.73 (2.57)	4.13 (2.59)	4.29 (2.69)	11098.50	.180	-.19 [-.48, .09]	14496.50	.192	-.17 [-.42, .09]	1985.00	.881	-.03 [-.38, .33]
Individual/ Clinical	6.67 (4.04)	4.59 (3.78)	5.21 (3.61)	8781.00	<.001	-.54 [-.82, -.24]	12745.50	.005	-.37 [-.62, -.11]	1806.00	.311	-.18 [-.58, .18]
Protective	3.47 (1.82)	3.86 (1.78)	3.85 (1.64)	10943.50	.132	-.22 [-.50, .07]	14115.00	.101	-.21 [-.46, .04]	1987.00	.887	-.03 [-.38, .33]
Risk Total	18.61 (9.42)	14.20 (9.34)	15.14 (9.18)	9179.00	.001	-.48 [-.76, -.18]	12492.50	.003	-.40 [-.65, -.14]	1890.50	.546	-.11 [-.46, .25]
High SRR	*n (%)*	*n (%)*	*n (%)*	χ^2	*p*	*r* [95% CI]	χ^2	*p*	*r* [95% CI]	χ^2	*p*	*r* [95% CI]
Violent	91 (20.45)	9 (16.07)	18 (25.00)	0.60	.440	.03 [-.05, .12]	0.77	.380	.04 [-.05, .12]	1.51	.219	.11 [-.06, .28]
Non-Violent	103 (23.15)	11 (19.64)	9 (12.50)	0.35	.556	.03 [-.06, .11]	4.14	.042	.09 [.003, .17]	1.22	.270	.10 [-.08, .27]

Note. SAVRY = Structured Assessment of Violence Risk in Youth. CI = confidence interval. SRR = Summary Risk Rating. Effect sizes for δ (Newcombe, 2006a, 2006b): small = .20, medium = .50, large = .80, and effect sizes for *r*: small = .10, medium =.30, large = .50 (Cohen, 1992).

Table 3

Post Hoc Chi-Square Analyses for Group Differences in SAVRY Domains and Items

	Groups						Differences					
	White (n = 445)		East/Southeast Asian (n = 56)		South Asian (n = 72)		White versus East/Southeast Asian			White versus South Asian		
SAVRY Items	*n*	*%*	*n*	*%*	*n*	*%*	χ^2	*p*	*r* [95% CI]	χ^2	*p*	*r* [95% CI]
Historical Risk (High)												
History of violence	135	30.34	18	32.14	23	31.94	0.08	.782	.01 [-.07, .10]	0.08	.784	.01 [-.07, .10]
History of non-violent offending	120	26.97	14	25.00	18	25.00	0.10	.754	.01 [-.07, .10]	0.12	.726	.02 [-.07, .10]
Early initiation of violence	56	12.58	8	14.29	5	6.94	0.13	.719	.02 [-.07, .10]	1.89	.169	.06 [-.03, .15]
Past supervision/intervention failures	125	28.09	14	25.00	10	13.89	0.24	.626	.02 [-.07, .11]	6.48	.011	.11 [.03, .20]
History of self-harm/suicide	28	6.29	3	5.36	5	6.94	0.08	.784	.01 [-.07, .10]	0.04	.834	.01 [-.08, .09]
Exposure to violence in the home	81	18.20	8	14.29	10	13.89	0.52	.470	.03 [-.06, .12]	0.80	.373	.04 [-.05, .12]
Childhood history of maltreatment	63	14.16	6	10.71	7	9.72	0.50	.481	.03 [-.06, .12]	1.04	.308	.04 [-.04, .13]
Parental/caregiver criminality	52	11.69	3	5.36	8	11.11	2.04	.153	.06 [-.02, .15]	0.02	.888	.01 [-.08, .09]
Early caregiver disruption	82	18.43	5	8.93	3	4.17	3.13	.077	.08 [-.01, .17]	9.17	.002	.13 [.05, .22]
Poor school achievement	182	40.90	9	16.07	19	26.39	13.00	<.001	.16 [.07, .25]	5.49	.019	.10 [.02, .19]
Social/Contextual Risk (High)												
Peer delinquency	131	29.44	16	28.57	22	30.56	0.02	.893	.01 [-.08, .09]	0.04	.847	.01 [-.08, .09]
Peer rejection	67	15.06	4	7.14	5	6.94	2.56	.110	.07 [-.02, .16]	3.40	.065	.08 [-.01, .17]
Stress and poor coping	161	36.18	11	19.64	16	22.22	6.03	.014	.11 [.02, .20]	5.36	.021	.10 [.02, .19]
Poor parental management	97	21.80	15	26.79	15	20.83	0.71	.398	.04 [-.05, .12]	0.03	.854	.01 [-.08, .09]
Lack of personal/social support	43	9.66	10	17.86	8	11.11	3.53	.060	.08 [-.004, .17]	0.15	.702	.02 [-.07, .10]
Community disorganization	24	5.39	0	-	8	11.11	3.17	.075	.08 [-.01, .17]	3.50	.062	.08 [-.004, .17]
Individual/Clinical Risk (High)												
Negative attitudes	65	14.61	6	10.71	7	9.72	0.62	.431	.04 [-.05, .12]	1.23	.267	.05 [-.04, .13]
Risk taking/impulsivity	127	28.54	8	14.29	15	20.83	5.13	.023	.10 [.01, .19]	1.85	.174	.06 [-.03, .15]
Substance use difficulties	121	27.19	5	8.93	8	11.11	8.81	.003	.13 [.05, .22]	8.56	.003	.13 [.04, .21]
Anger management problems	102	22.92	5	8.93	18	25.00	5.80	.016	.11 [.02, .19]	0.15	.698	.02 [-.07, .10]
Low empathy/remorse	77	17.30	12	21.43	8	11.11	0.58	.447	.03 [-.05, .12]	1.73	.188	.06 [-.03, .14]

	Groups						Differences					
	White (n = 445)		East/Southeast Asian (n = 56)		South Asian (n = 72)		White versus East/Southeast Asian			White versus South Asian		
SAVRY Items	*n*	*%*	*n*	*%*	*n*	*%*	χ^2	*p*	*r* [95% CI]	χ^2	*p*	*r* [95% CI]
ADHD difficulties	75	16.85	2	3.57	3	4.17	6.75	.009	.12 [.03, .20]	7.79	.005	.12 [.04, .21]
Poor compliance	74	16.63	2	3.57	13	18.06	6.59	.010	.11 [.03, .20]	0.09	.764	.01 [-.07, .10]
Low commitment/interest in school	147	33.03	9	16.07	15	20.83	6.67	.010	.12 [.03, .20]	4.29	.038	.09 [.005, .18]
Protective (Present)												
Prosocial involvement	185	41.57	34	60.71	34	47.22	7.41	.006	.12 [.03, .21]	0.81	.368	.04 [-.05, .13]
Strong social support	301	67.64	36	64.29	51	70.83	0.25	.614	.02 [-.07, .11]	0.29	.590	.02 [-.06, .11]
Strong attachments and bonds	361	81.12	44	78.57	63	87.50	0.21	.647	.02 [-.07, .11]	1.71	.191	.06 [-.03, .14]
Positive attitudes towards intervention and authority	293	65.84	37	66.07	47	65.28	0.01	.973	.005 [-.08, .09]	0.01	.925	.004 [-.08, .09]
Strong commitment to school	149	33.48	29	51.79	36	50.00	7.27	.007	.12 [.03, .21]	7.36	.007	.12 [.03, .20]
Resilient personality traits	253	56.85	36	64.29	46	63.89	1.13	.289	.05 [-.04, .13]	1.26	.262	.05 [-.04, .13]

Note. SAVRY = Structured Assessment of Violence Risk in Youth. CI = confidence interval. Effect sizes for *r*: small = .10, medium =.30, large = .50 (Cohen, 1992).

Table 4

AUC Scores for Violent and Non-Violent Recidivism

	Groups									Differences					
	White (n = 445)			East/Southeast Asian (n = 56)			South Asian (n = 72)			White versus East/Southeast Asian		White versus South Asian		East/Southeast Asian versus South Asian	
SAVRY Ratings	AUC (SE)	95% CI	p	AUC (SE)	95% CI	p	AUC (SE)	95% CI	p	Z	p	Z	p	Z	p
Violent															
Historical	.68 (.03)	.62, .74	<.001	.78 (.14)	.50, 1.00	.029	.77 (.06)	.65, .89	.004	-0.79	.428	-0.96	.335	0.06	.956
Social/ Contextual	.67 (.03)	.61, .73	<.001	.76 (.12)	.53, .99	.039	.76 (.09)	.59, .93	.004	-0.72	.474	-0.99	.321	-0.02	.984
Individual/ Clinical	.70 (.03)	.63, .76	<.001	.81 (.13)	.55, 1.00	.013	.78 (.08)	.62, .94	.002	-1.01	.313	-0.95	.343	0.23	.822
Protective	.63 (.03)	.56, .70	.001	.69 (.13)	.44, .94	.128	.68 (.08)	.51, .84	.056	-0.49	.626	-0.48	.628	0.10	.918
Risk Total	.71 (.03)	.65, .77	<.001	.81 (.15)	.52, 1.00	.015	.79 (.07)	.65, .94	.001	-0.84	.398	-0.98	.330	0.09	.931
Violent SRR	.66 (.04)	.59, .73	<.001	.72 (.12)	.48, .95	.085	.78 (.06)	.66, .90	.002	-0.43	.665	-1.31	.192	-0.42	.672
Non-Violent															
Historical	.76 (.02)	.71, .80	<.001	.89 (.04)	.81, .97	<.001	.73 (.06)	.61, .86	.002	-2.30	.022	0.33	.745	1.83	.067
Social/ Contextual	.70 (.03)	.65, .75	<.001	.77 (.06)	.65, .89	.002	.83 (.06)	.71, .94	<.001	-0.86	.389	-1.90	.057	-0.60	.550
Individual/ Clinical	.74 (.03)	.69, .78	<.001	.88 (.04)	.80, .97	<.001	.83 (.06)	.72, .94	<.001	-2.39	.017	-1.36	.172	0.72	.473
Protective	.69 (.03)	.64, .74	<.001	.73 (.07)	.59, .86	.008	.73 (.06)	.61, .85	.003	-0.43	.664	-0.49	.622	-0.01	.992
Risk Total	.77 (.02)	.72, .81	<.001	.89 (.04)	.81, .98	<.001	.82 (.05)	.72, .93	<.001	-2.12	.034	-0.81	.417	0.90	.368
Non-Violent SRR	.71 (.03)	.66, .76	<.001	.87 (.06)	.75, .98	<.001	.64 (.07)	.50, .79	.059	-2.44	.015	0.82	.411	2.36	.018

Note. SAVRY = Structured Assessment of Violence Risk in Youth. CI = confidence interval. SRR = Summary Risk Rating. AUC = area under the curve. Protective domain scores were used to predict non-recidivism (i.e., desistence). Effect sizes for AUCs: small = .556, medium =.639, large = .714 (Rice & Harris, 2005). Violent recidivism base rate: White Canadians = 15.73%, East/Southeast Asian Canadians = 10.71%, South Asian Canadians = 16.67%. Non-violent recidivism base rate: White Canadians = 35.06%, East/Southeast Asian Canadians = 30.36%, South Asian Canadians = 29.17%.

Table 5

PPVs, NPVs, Sensitivity and Specificity for Violent and Non-Violent Recidivism

		PPV	NPV	False Positive	False Negative	Sensitivity	Specificity
	n	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]
Violent							
White	276	31.87 [22.71, 42.58]	91.35 [86.10, 94.82]	68.13 [57.42, 77.29]	8.65 [5.18, 13.90]	64.44 [48.73, 77.71]	73.16 [66.87, 78.66]
East/Southeast Asian	30	33.33 [9.04, 69.08]	95.24 [74.13, 99.75]	66.67 [30.92, 90.96]	4.76 [0.25, 25.87]	75.00 [21.94, 98.68]	76.92 [55.92, 90.25]
South Asian	41	38.89 [18.26, 63.86]	100 [82.19, 100]	61.11 [36.14, 81.74]	0 [0, 17.81]	100 [56.09, 100]	67.65 [49.37, 82.02]
Non-Violent							
White	278	66.02 [55.95, 74.88]	81.71 [75.01, 86.99]	33.98 [25.12, 44.05]	18.29 [13.01, 24.99]	68.00 [57.82, 76.78]	80.34 [73.58, 85.75]
East/Southeast Asian	40	90.91 [57.12, 99.52]	93.10 [75.79, 98.80]	9.09 [0.48, 42.88]	6.90 [1.20, 24.21]	83.33 [50.88, 97.06]	96.43 [79.76, 99.81]
South Asian	41	55.56 [22.65, 84.66]	81.25 [62.96, 92.14]	44.44 [15.34, 77.35**]**	18.75 [7.86, 37.04]	45.55 [18.14, 75.44]	86.67 [68.36, 95.64]

Note. CI = confidence interval. PPV = positive predictive value. NPV = negative predictive value. Violent Summary Risk Ratings were used to predict violent recidivism. Non-violent Summary Risk Ratings were used to predict non-violent recidivism. Youth with Moderate risk ratings were excluded in these analyses.

Table 6

Cox Proportional Hazard Regressions for SAVRY Risk Total Scores

	Violent Recidivism				Non-Violent Recidivism			
Variables	β (SE)	HR [95% CI]	Wald	*p*	β (SE)	HR [95% CI]	Wald	*p*
Block 1								
SAVRY Risk Total	0.08 (0.11)	1.09 [1.06, 1.11]	52.42	<.001	0.09 (0.01)	1.09 [1.08, 1.11]	131.31	<.001
Racial Group								
East/Southeast Asian	-0.41 (0.32)	0.67 [0.36, 1.24]	1.66	.197	-0.10 (0.23)	0.90 [0.57, 1.43]	0.19	.664
South Asian	-0.26 (0.50)	0.77 [0.29, 2.06]	0.27	.602	0.31 (0.33)	1.36 [0.72, 2.59]	0.88	.349
Block 2								
SAVRY Risk Total	0.09 (0.03)	1.10 [1.04, 1.16]	11.89	.001	0.09 (0.02)	1.09 [1.05, 1.14]	18.87	<.001
Racial Group								
East/Southeast Asian	-0.30 (0.36)	0.74 [0.37, 1.49]	0.70	.402	-0.06 (0.26)	0.94 [0.57, 1.56]	0.06	.808
South Asian	-0.61 (0.66)	0.54 [0.15, 1.96]	0.87	.350	0.09 (0.38)	1.09 [0.52, 2.30]	0.05	.819
SAVRY Risk Total*Racial Group								
Risk Total*East/Southeast Asian	-0.02 (0.03)	0.98 [0.93, 1.04]	0.39	.534	-0.01 (0.02)	0.99 [0.95, 1.04]	0.07	.794
Risk Total*South Asian	0.08 (0.06)	1.08 [0.96, 1.22]	1.71	.191	0.07 (0.04)	1.07 [0.99, 1.15]	3.15	.076

Note. SAVRY = Structured Assessment of Violence Risk in Youth. CI = confidence interval. HR = hazard ratio. White Canadians were the reference category for racial group. Violent recidivism base rate: White Canadians = 15.73%, East/Southeast Asian Canadians = 10.71%, South Asian Canadians = 16.67%. Non-violent recidivism base rate: White Canadians = 35.06%, East/Southeast Asian Canadians = 30.36%, South Asian Canadians = 29.17%.

Table 7

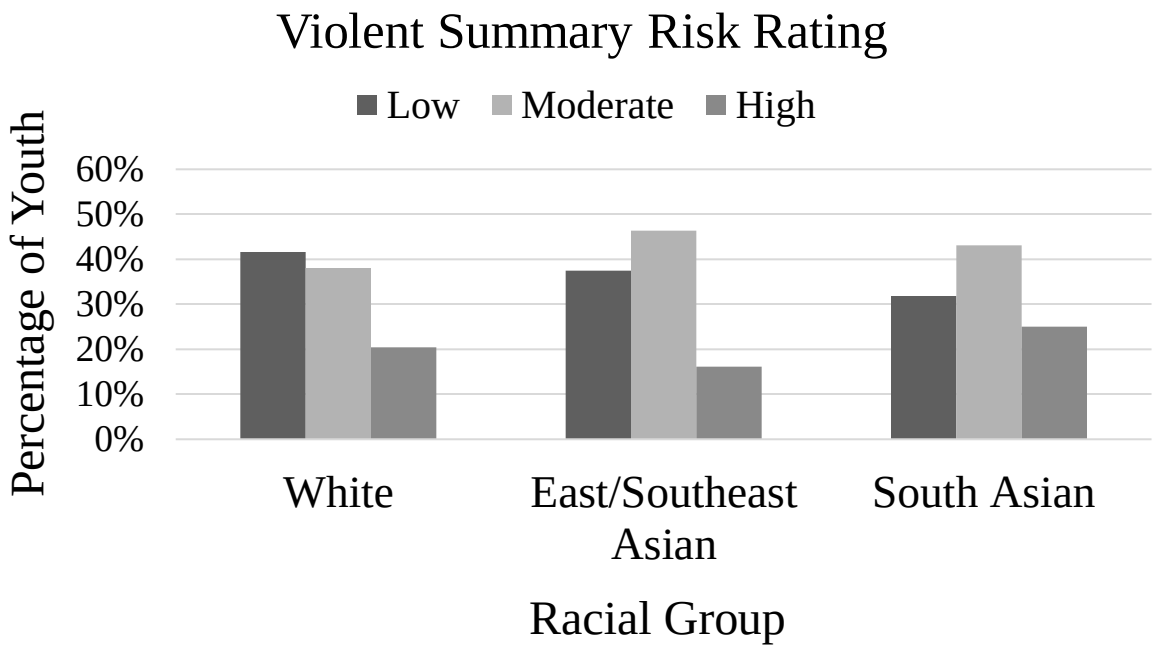
Cox Proportional Hazard Regressions for SAVRY Summary Risk Ratings

	Violent Recidivism				Non-Violent Recidivism			
Variables	β (SE)	HR [95% CI]	Wald	*p*	β (SE)	HR [95% CI]	Wald	*p*
Block 1								
SAVRY SSR	0.91 (0.15)	2.49 [1.87, 3.32]	38.51	<.001	0.93 (0.10)	2.54 [2.10, 3.08]	91.61	<.001
Racial Group								
East/Southeast Asian	-0.06 (0.31)	0.94 [0.51, 1.74]	0.04	.852	0.03 (0.23)	1.03 [0.65, 1.62]	0.01	.912
South Asian	-0.30 (0.50)	0.74 [0.28, 1.98]	0.36	.547	0.21 (0.33)	1.24 [0.65, 2.34]	0.42	.519
Block 2								
SAVRY SSR	1.65 (0.49)	5.21 [1.98, 13.66]	11.24	.001	0.74 (0.31)	2.09 [1.13, 3.86]	5.55	.019
Racial Group								
East/Southeast Asian	1.15 (0.86)	3.16 [0.59, 17.05]	1.79	.181	-0.08 (0.40)	0.92 [0.42, 2.02]	0.04	.843
South Asian	0.29 (1.23)	1.34 [0.12, 14.87]	0.06	.811	-1.07 (0.68)	0.34 [0.09, 1.30]	2.47	.116
SAVRY SSR*Racial Group								
SSR*East/Southeast Asian	-0.86 (0.52)	0.42 [0.15, 1.16]	2.78	.096	0.12 (0.33)	1.13 [0.59, 2.16]	0.14	.710
SSR*South Asian	-0.37 (0.78)	0.70 [0.15, 3.20]	0.22	.640	1.08 (0.47)	2.96 [1.17, 7.46]	5.26	.022

Note. SAVRY = Structured Assessment of Violence Risk in Youth. CI = confidence interval. SRR = Summary Risk Rating. HR = hazard ratio. White Canadians were the reference category for racial group. Youth probation officers' Summary Risk Ratings for violent and non-violent recidivism were included for their respective model (i.e., Violent Summary Risk Rating for violent recidivism; Non-Violent Summary Risk Rating for non-violent recidivism). Violent recidivism base rate: White Canadians = 15.73%, East/Southeast Asian Canadians = 10.71%, South Asian Canadians = 16.67%. Non-violent recidivism base rate: White Canadians = 35.06%, East/Southeast Asian Canadians = 30.36%, South Asian Canadians = 29.17%.

Figure 1

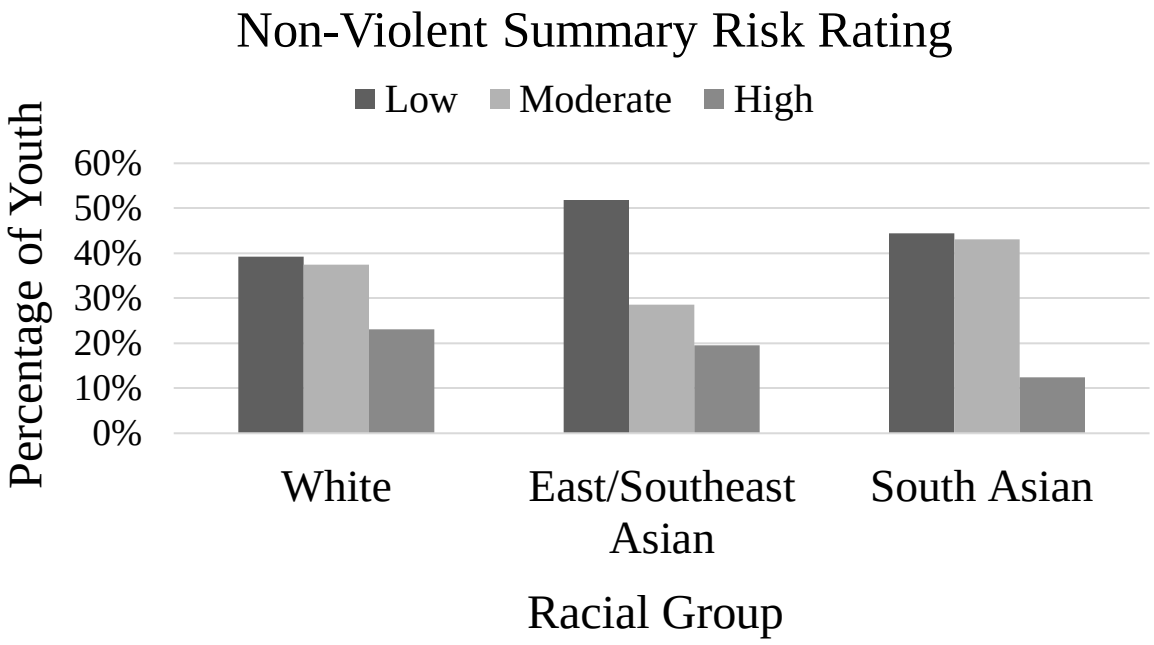
Distribution of SAVRY Summary Risk Ratings for Violent Recidivism



Note. n = 445 for White Canadians, n = 56 for East/Southeast Asian Canadians, and n = 72 for South Asian Canadians.

Figure 2

Distribution of SAVRY Summary Risk Ratings for Non-Violent Recidivism



Note. n = 445 for White Canadians, n = 56 for East/Southeast Asian Canadians, and n = 72 for South Asian Canadians.