Article

Youth Violence and Juvenile Justice
2019, Vol. 17(2) 194-213

DOI: 10.1177/1541204018778887
journals.sagepub.com/home/yvj


Risk and Protective Factors for Probation Success Among Youth Offenders in Singapore

Dongdong Li[1], Chi Meng Chu[1], Xuexin Xu[1], Gerald Zeng[1], and Kala Ruby[2]

Abstract

The study examined the risk and protective factors for the successful completion of probation orders among youth offenders in Singapore. Specifically, we proposed a typology whereby a predictor can be labeled as a promotive factor, hazard factor, or mixed factor in a direct relationship; or a booster factor or buffering factor in an interactive relationship. This study included 701 youth offenders. Retrospective case file coding was conducted to score the Youth Level of Service/Case Management Inventory (YLS/CMI) and Structured Assessment of Protective Factors for Violence Risk–Youth Version (SAPROF-YV). Most SAPROF factors were shown to be mixed protective factors, whereas most YLS/CMI domains were either mixed risk factors or hazard factors. An absence of a supportive external pedagogical climate (PC) was the strongest mixed factor. For youth with high PC, significant booster factors included high levels of attitudes toward agreements and conditions, motivation for treatment, perseverance, and bonding to school/work, as well as low levels of risk in peer relations and education/employment. For youth with limited PC, buffering factors with the strongest effects include self-control, future orientation, and school/work. Implications for practice and future research were discussed.

Keywords

youth offender, protective factor, risk factor, YLS/CMI, SAPROF

Youth offending and reoffending is a costly societal problem. Though in a decreasing trend, the number of youth arrested and convicted each year is still high worldwide. According to the World Health Organization (WHO), an estimated 200,000 homicides occur among youth each year globally (WHO, 2016). Risk and protective factors associated with youth crime have received extensive attention from scholars. However, different terminologies have been used to describe risk and protective factors in existing literature (Ttofi, Farrington, Piquero, & DeLisi, 2016), and studies

[1] Centre for Research on Rehabilitation and Protection, Ministry of Social and Family Development, Singapore, Singapore
[2] Probation and Community Rehabilitation Service, Ministry of Social and Family Development, Singapore, Singapore

Corresponding Author:
Dongdong Li, Centre for Research on Rehabilitation and Protection, Ministry of Social and Family Development, 512 Thomson Road, #12-00 MSF Building, Singapore 298136, Singapore.
Email: li_dongdong@msf.gov.sg

have shown considerable variations in the crime and recidivism rates. A recent systematic review of prospective longitudinal studies showed that the prevalence of life-course–persistent offenders varied vastly between 1.3% and 29.1% due to the differences in the study population and the definition of key constructs (Jolliffe, Farrington, Piquero, MacLeod, & van de Weijer, 2017). Therefore, research using shared definitions of variables examining the mechanisms of youth crime are critically needed in criminology research. Establishment of a typology of risk and protective factors is necessary to inform prevention and intervention programs for better offender rehabilitation outcomes in different cultures.

Standardizing the Definitions of Risk and Protective Factors

In the forensic risk assessment literature, risk factors are found to be consistently defined as variables that increase the likelihood of negative outcomes (Farrington, Ttofi, & Piquero, 2016; Vagi et al., 2013). In addition, risk factors should precede the outcomes and can be used to classify a population into high-risk and low-risk groups (Kraemer et al., 1997). In forensic risk assessment, risk factors can be categorized as "static" and "dynamic" depending on their relative variability over time. Specifically, static risk factors refer to variables that are usually not amenable to change over time, for instance, history of violence. On the other hand, dynamic risk factors refer to variables that can fluctuate with time and circumstances and can be changed through planned intervention, such as family relationship and antisocial attitudes (e.g., Chu, Thomas, Ogloff, & Daffern, 2013; Douglas & Skeem, 2005). These terms have been used consistently across studies (Andrews, Bonta, & Wormith, 2006; Monahan & Skeem, 2016).

In contrast, the definition of protective factors and how the protective factors impact youth offending and reoffending have caused some confusion. Some researchers conceptualized protective factors as the absence of or opposite to risk factors (e.g., McAra & McVie, 2016; White, Moffitt, & Silva, 1989), whereas others defined protective factors as distinct and stand-alone entities separated from the presence of risk factors (e.g., Borum, Bartel, & Forth, 2006; de Vogel, de Ruiter, Bouman, & de Vries Robbé, 2009). Researchers conducting resilience studies used "compensatory model" and "protective model" to differentiate protective factors that can have direct effects on an outcome as compared to interactive effects with a risk factor (Fergus & Zimmerman, 2005). Similarly, promotive factors (that predict a low probability of offending in a direct relationship) and interactive protective factors (that interact with risk factors to nullify the negative effects) were used in the offending literature (Farrington et al., 2016). However, the term "promotive factor" (as compared to mixed factor) was also used in some studies to describe a nonlinear relationship between a protective factor and a negative outcome (Farrington et al., 2016). All these different definitions of protective factors lead to confusion in terms of understanding and synthesizing the research results. In this article, we built on the previous studies and proposed a more comprehensive typology of risk and protective factors. As shown in Table 1, the grouping of terms is based on whether a factor is directly or indirectly influencing an outcome variable.

Promotive, Hazard, and Mixed Factors: Direct Relationship With Outcome

According to Farrington et al. (2016), a protective factor can be classified as a promotive factor (nonlinearly related to an outcome) and a mixed factor (linearly related to an outcome) in a direct relationship. To understand the direct relationships, each factor is trichotomized into three categories, and the differences were compared across the three categories in relation to the outcome. In this way, both linear and nonlinear relationship can be identified. We propose that a similar definition for risk factors could be included in the typology, indicating that a risk factor can also be nonlinearly related to an outcome. In Farrington's work, the three categories were referred to as

Table 1. A Typology of Risk and Protective Factors.

Relationship		Term Definition
Direct relationship	Mixed factor	Linearly related to the probability of risky behavior
	Promotive factor	Relationship with outcome is nonlinear. High level of promotive factor is negatively related to low probability of risk behavior
	Hazard factor	Relationship with outcome is nonlinear. High level of hazard factor is positively related to high probability of risk behavior
Interactive relationship	Booster factor	A protective factor that boosts the effect of another protective factor (cumulative protective factor) or a risk factor that boosts the effect of another risk factor (cumulative risk factor)
	Buffering factor	A protective factor that buffers the effect of a risk factor (risk-based protective factor)

promotive category, middle category, and risk category. He also used the "best" and the "worst" categories to describe the promotive and the risk category. In this article, we used the following terms to describe the three categories: (1) a promotive category which refers to the protective end of the factor, (2) a hazard category which refers to the risk end of the factor, and (3) an intermediate category in between the promotive and hazard category.

As shown in Figure 1, a factor is labeled as a *promotive factor* when the protective effect is highest only at the promotive category. Similarly, a factor is labeled as a *hazard factor* if the risk effect is highest only at the hazard category. For instance, low neuroticism was found to be a promotive factor, in that low neuroticism is associated with lower likelihood of offending, whereas high neuroticism was not related to higher likelihood of offending as compared to medium neuroticism (Farrington et al., 2016). Similarly, Loeber, Farrington, Stouthamer-Loeber, and White (2008) identified school achievement as a promotive factor (high school achievement related to better outcomes while low school achievement not related to worse outcomes) and peer delinquency as a hazard factor (high peer delinquency related to worse outcomes while low peer delinquency not related to better outcomes).

When a factor is linearly related to the outcome, it is labeled as a *mixed factor* following the work of Farrington et al. (2016). A mixed factor can be further split into a mixed protective factor and a mixed risk factor based on the conceptualization. Due to the linear relationship, a mixed protective factor and a mixed risk factor are arguably at the two ends of the same scale. Take hyperactivity for example, it was found that low level of hyperactivity is related to lower risk of youthful convictions, while high level of hyperactivity is related to higher risk (Farrington et al., 2016). In this case, hyperactivity is a mixed factor in that low hyperactivity is protective and high hyperactivity is a risk.

Booster and Buffering Factors: Interactive Relationship With Outcome

In addition to the direct relationships, there could be interactions between risk and protective factors. Interaction effect is also called a moderation effect, where a moderator can affect the strength or even direction of the relation between a predictor and an outcome. In the previous studies on protective factors, such a factor with a significant interaction effect was referred to as an interactive protective factor (Farrington et al., 2016). In this article, we propose that such a factor can be a *booster factor* or a *buffering factor*. A booster factor refers to a protective factor that increase the effect of another protective factor (or the protective end of a factor) or a risk factor that augment the effect of another risk factor (or the hazard end of a factor). In these cases, a booster factor implies cumulative effect of two variables of the same type. For example, low honesty was shown to add on

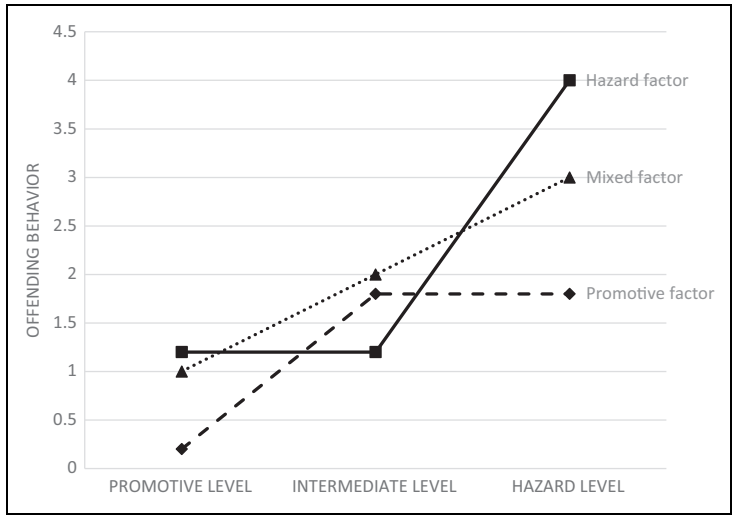

Figure 1. Mixed, promotive, and hazard factors.

to the negative effect of the parents' conviction history to further increase the likelihood of the youth's conviction outcome (Farrington et al., 2016). Low honesty can thus be conceptualized as a booster risk factor for parent's conviction history on child's conviction outcome.

A buffering factor, in contrast, refers to a protective factor that reduces the effect of a risk factor (or the hazard end of a factor). For example, parents' conviction history is usually positively related to a child's conviction outcome. But this relationship was found to be mitigated by high family income (Farrington et al., 2016). Therefore, high family income is a buffering factor for parents' conviction history on child's conviction outcome. Other buffering factors include anxiety about aggression (Dubow, Huesmann, Boxer, & Smith, 2016) and academic achievement (Jolliffe, Farrington, Loeber, & Pardini, 2016). A buffering factor shares the same meaning as an interactive protective factor used by Farrington and colleagues (2011). A summary of these definitions is presented in Table 1.

The above classification was based on whether there was a direct or an interactive relationship between predictors and outcomes. We found a possible exception during our literature review, which pertained to the definition of risk-based protective factor. Specifically, the term was defined as those protective factors that predict a low probability of negative events among a high-risk group (Farrington & Ttofi, 2011). This term was usually used in designs, whereby the high-risk group was the only target of analysis, in which a direct relationship was tested between a protective factor and an outcome. However, this term can also be explained in an interactive relationship. The high-risk-only design could be upgraded to a moderation analysis using multigroup framework, where the direct relationship can be further compared between the high-risk and the low-risk group. For example, the protective effect of a risk-based protective factor might only exist for the high-risk group but not for the low-risk group. Based on these considerations, the concept of risk-based protective factor is considered to be covered by the definition of buffering factors.

Singapore: An Independent State With Low Crime Rate and Multicultural Influences

Singapore is an independent island-state in South East Asia with a land area of 718 square kilometers. Singapore was previously an English colony in the 1800s but gained her independence in 1965. As such, many statutes in Singapore are based on English common laws (e.g., the Criminal

Procedure Code, 2012). Nonetheless, there are some statutes that are based on legislation from other jurisdictions (e.g., India, previously another English colony), which were still formulated by the English in 1800s. Therefore, it is unsurprising that similarities with other jurisdictions exist in the way that offenses are defined in Singapore, but the exact language of the laws might differ.

Since the early 2000s, Singapore has adopted the risk–need–responsivity (RNR) framework as a theoretical- and empirical-based approach for offender assessment and rehabilitation services. The RNR framework articulates three core principles: Risk principle states service intensity should be matched with cases' risk levels; need principle emphasizes importance of assessing and targeting criminogenic needs in case management; responsivity principle describes how to deliver treatment and intervention (Bonta & Andrews, 2017). Under the RNR framework, Singapore provided an ideal test ground for research on the role played by risk and protective factors among youth offenders.

With a total population of 5.47 million[1] (Singapore Department of Statistics, 2015), Singapore has a low crime rate and reported a total of 32,964 crime cases in 2016 (Singapore Police Force, 2017). According to Ministry of Social and Family Development (2017), about 1,057 youths between 7 and 16 years were arrested in 2016. Majority of previous studies focused on Western countries where the crime rates are above the global highest quartile, despite a general decreasing trend in juvenile arrest rate in recent years (Harrendorf, Heiskanen, & Malby, 2010). Comparatively, fewer studies had been carried out in countries or places with low crime rate.

Low crime rates in Asian countries could be linked to cultural factors (Nivette, 2011). Notwithstanding that there is some degree of agreement across cultures about what constitutes offending behavior, development of deviant attitudes and behaviors can differ due to cultural norms, values, and beliefs. For instance, in Singapore, the strict laws and punishment of drug abuse reflected the low tolerance of drug abuse in the mainstream society, and this could have led to a lower prevalence of drug-related crime compared to Western countries (Teo, 2010). Cultural background may also affect the pathways of youth crime. Previous cross-national studies have revealed both similarities and differences in the effects of risk and protective factors on youths (Jessor et al., 2003; Posick & Rocque, 2015; Vazsonyi et al., 2010). However, factors predicting youth crime have not been fully examined in the Singapore context. Using Singapore as the test ground to examine the proposed typology, this study could contribute to existing criminology research and reveal a more complete picture about risk and protective factors linked to youth crime.

Measurements of Risk and Protective Factors

There are multiple widely used assessment tools in the field of youth justice, such as the Youth Level of Service/Case Management Inventory (YLS/CMI) and the Structured Assessment of Violence Risk in Youth (SAVRY). Several systematic reviews and meta-analyses had been conducted on the predictive efficacy of such risk assessment tools (Fazel, Singh, Doll, & Grann, 2012; Singh, Grann, & Fazel, 2011; Yang, Wong, & Coid, 2010), and it was found that the heterogeneity between studies was largely explained by the methodological features rather than differences between tools (Yang et al., 2010). YLS/CMI and subsequently the YLS/CMI 2.0 have been widely applied to studies of youth offending and recidivism, in both Western (e.g., McGrath & Thompson, 2012; Onifade et al., 2008; Rennie & Dolan, 2010; Schmidt, Campbell, & Houlding, 2011) and Asian contexts (e.g., Chu et al., 2015; Chu, Yu, Lee, & Zeng, 2014; Lai, Zeng, & Chu, 2016; Takahashi, Mori, & Kroner, 2013). In Singapore, the YLS/CMI (and subsequently the YLS/CMI 2.0) was chosen as the primary risk assessment measure to assess the risk and needs of youth offenders and adapted for local usage (Chua, Chu, Yim, Chong, & Teoh, 2014). Overall, the results suggest that the YLS/CMI is suited for assessing youth offenders in terms of their risk of general recidivism within a non-Western context (Chu et al., 2015).

In contrast, there appears to be a paucity of measures that are designed specifically to assess protective factors among youth offenders. The Structured Assessment of Protective Factors for Violence Risk–Youth Version (SAPROF-YV) is a recently developed strength-based measure to assess future violent behaviors that could be used in conjunction with other risk assessment tools. Several studies provided evidence of the predictive validity of SAPROF adult version, but not the youth version (de Vries Robbé, de Vogel, & de Spa, 2011; de Vries Robbé, de Vogel, Koster, & Bogaerts, 2015; de Vries Robbé & Willis, 2017). In Singapore, research on the utility of SAPROF adult version has been conducted on sexual offenders and the study showed good interrater reliability for SAPROF but low predictive validity on recidivism among youth who sexually offended (Zeng, Chu, & Lee, 2015). This could be due to the (in)appropriateness of the SAPROF adult version being used with a youth population and possibly with sexual offending population.

The Present Study

To increase the knowledge base on the protective and risk factors for youth offenders, this study aims to examine a typology of risk and protective factors as well as to explore the effects of multiple protective factors in the presence of risk factors for youth offenders placed on probation in Singapore with respect to completing their probation orders. The following two research questions were examined in this study:

Research Question 1: What are the different types of risk and protective factors for failing to complete a probation order?

Research Question 2: How these protective factors buffer or boost the effect of the other factors on probation order completion?

Data and Method

Participants

The sample included a total of 701 youth offenders who ended their probation orders between January 2013 and December 2014. These youth offenders were aged between 9 and 19 years at the start of order ($M = 15.95$, $SD = 1.50$, $Mdn = 16$), and 95% of them were within 14–18 years. Majority of the offenders were males ($n = 609$, 87%) and were of Chinese ethnicity ($n = 366$, 52%). In addition, more than half ($n = 389$, 56%) of the sample committed nonviolent property offenses (e.g., theft), 17.1% ($n = 120$) committed violent offenses against other persons (e.g., causing hurt and robbery), and 12% ($n = 63$) committed violent property offenses (e.g., destruction of property). A small group of the sample ($n = 40$, 6%) committed sexual offenses (e.g., having sex with a minor, molestation, and voyeuristic offenses).

Measures

Demographics. This study collected demographic information on individuals' age at the start of order, gender, and race.

Risk factors. This study used the YLS/CMI 2.0 (Hoge & Andrews, 2011) to measure the risk factors for youth offenders. It comprises of 42 items in eight domains (i.e., prior and current offenses/dispositions, family circumstances/parenting, education/employment, peer relations, substance abuse, leisure/recreation, personality/behavior, and attitudes/orientation). The item scores in each domain were aggregated to obtain a total score, which was further categorized into "low risk" (which correspond to the promotive category), "moderate risk" (the intermediate category), and

"high/very high risk" (the hazard category). A detailed description of the domains can be found in Appendix.

Protective factors. The protective factors were measured by SAPROF-YV, which was developed to measure protective factors for youth (de Vries Robbe et al., 2015). It is comprised of 16 dynamic protective factors, including resilience, motivational, relational, and external items. Each item was rated on a 3-point scale, including "clearly present" (which correspond to the promotive category), "present to some extent" (the intermediate category), and "hardly present" (the hazard category). Due to low variations in the responses, the items on "medication," "professional care," and "court order" were excluded from the analysis. Appendix presents a detailed description of the items.

Outcome measure. The outcome variable in this study was "probation order completion status." It refers to whether a youth successfully completed the probation order based on official record. In Singapore, probation is a court-ordered community-based rehabilitation program for offenders. When an offender is placed on probation, he or she will be under the supervision of a probation officer and will be guided to comply with the stated conditions of the order. These conditions may vary according to the offence committed, and unique risk and needs of each case. The supervision process is facilitated through evidence-based interventions and partnerships between the probation officer, the offenders, their families, and key community partners. If an offender serves the order without incurring a new charge or breach for violating the conditions of probation, the probation order is considered to have been completed successfully. In contrast, if an offender reoffends or violates the supervision rules, it will lead to a breach that revokes the probation order and consequently result in probation noncompletion. Successful completion of probation was coded as "0," whereas noncompletion was coded as "1."

Procedure

The approval for the current research study was obtained from the Ministry of Social and Family Development. A total of seven research assistants were involved in the file coding between June 2015 and December 2015. These research assistants had attended a 1-day customized, intensive training program for the YLS/CMI and the SAPROF-YV, which involved lectures, discussions, case studies, and scoring practices. The training sessions were conducted by a research specialist who was a certified trainer for both assessment instruments. Multiple sources of information were obtained to code for the eight subscales of YLS/CMI, the 16 items of SAPROF-YV, as well as the youth offenders' background information. These sources of information included (a) psychological reports prepared by psychologists at the Clinical and Forensic Psychology Service, (b) reports prepared by the probation officers (e.g., presentence reports, breach reports, final discharge reports), (c) charge sheets, (d) statement of facts, (e) any previous assessment and treatment reports, as well as (f) school reports. The coding for YLS/CMI and SAPROF-YV was based mainly on the reports at presentencing stage before they started to serve the probation order. Coding for the background information and the outcomes was completed based on all file information available at the discharge of the probation order.

The interrater reliability (intraclass correlation coefficients [ICCs]: two-way random model with a consistency definition using single measures) ranged from .67 (pedagogical climate [PC]) to .97 (perseverance) for the 13 included protective factors for SAPROF-YV and from .64 (substance abuse) to .99 (prior and current offense/disposition) for eight YLS/CMI domains with an overall ICC of .93 for the YLS/CMI total score.

Analytical Strategy

Following the analysis of Loeber et al. (2008), Farrington et al. (2016), and Jolliffe, Farrington, Loeber, and Pardini (2016), the data analysis for the present study was conducted in the following steps:

Classify the YLS/CMI and SAPROF-YV items based on the typology of factors under direct relationships. A series of univariate logistic regression analysis were conducted using probation completion status as the outcome variable. Two odds ratios (*OR*) were computed by comparing the promotive or hazard category with the intermediate category. A factor was categorized as a mixed factor, a promotive factor, and a hazard factor based on the magnitude and the significance and confidence intervals (CI) of the hazard *OR* and promotive *OR*.

Identify a set of significant risk and protective factors and the strongest direct predictor using multivariate logistic regression while controlling for demographic variables. Due to the small cell sizes for some factors, all factors were coded into a two-category scale (hazard or promotive category).

Identify booster and buffering factors against the strongest direct predictor as found from the previous steps. Separate logistic regression analyses were conducted for each of the two categories of the identified predictor to test for the booster and buffering effects. In addition, an interaction term was also tested for each factor in a logistic regression model in order to identify inconsistent patterns of booster and buffering effects.

Results

Classify Risk and Protective Factors in Direct Relationships

Of the 701 cases, 157 (22%) did not complete their probation orders successfully. Tables 2 and 3 show the proportion of probation noncompletion in each of the three categories for all SAPROF-YV and YLS/CMI factors. The result showed that a majority of the SAPROF-YV factors (perseverance, motivation, attitudes, school/work, parents/guardians, and PC) had strong effects as mixed protective factors. Take PC for example, the promotive *OR* is 5.13 and the hazard *OR* is 7.60, indicating a possible linear relationship. Two items under the relational domain (peers and other supportive relationships) were found to have relatively insignificant protective effects.

Interestingly, a few items under the SAPROF-YV resilience domain (self-control, coping, and social competence) came out as potential hazard factors. For example, it showed that only the very low level of self-control was related to higher probability of noncompletion of probation orders, but the probability for the youth with clear presence of these factors was not significantly different from those in the intermediate category. However, the results may be influenced by the small numbers in the promotive category.

Majority of the YLS/CMI domains had strong effects as mixed risk factors or hazard factors. Specifically, family circumstances/parenting, personality/behavior, and attitudes/orientation were found to be mixed risk factors while education/employment and peer relations were found to be hazard factors. An exception was "prior and current offense/disposition," where low levels of prior and current offense/disposition were a promotive factor. It was found that low criminal history was related to lower probability of noncompletion, but the probability for the intermediate and hazard category was not significantly different. This result was possibly due to the small number in the hazard category as well. Beside, 2 items (substance abuse and leisure/recreation) were found to have relatively insignificant predictive power as risk factors.

After the univariate analysis, all variables were included in a multivariate logistic regression in predicting probation noncompletion. No significant multicollinearity was found as none of the VIF was greater than 2 and none of the tolerance value smaller than 0.1. The seven significant variables left in the equation using backward deletion method including low levels of protection in the following SAPROF-YV items: (1) future orientation ($OR = 2.21$, 95% CI = [1.30, 3.75]), (2) attitudes toward agreements and conditions ($OR = 4.07$, 95% CI = [2.28, 7.26]), (3) bonding to

Table 2. Protective Factors of Probation Noncompletion.

	% Probation Noncompletion			*OR*		
SAPROF-YV	P	M	H	P	H	Type
Resilience						
Social competence	1/21 (5%)	84/495 (17%)	72/185 (39%)	4.09 (0.54–30.88)	3.12** (2.14–4.55)	Hazard factor[b]
Coping	1/56 (2%)	28/288 (10%)	128/357 (36%)	5.92 (0.79–44.46)	5.19** (3.32–8.11)	Hazard factor[b]
Self-control	0/26 (0%)	24/268 (9%)	133/407 (33%)	2.76[a] (0.36–21.14)	4.94** (3.09–7.88)	Hazard factor[b]
Perseverance	1/88 (1%)	53/405 (13%)	103/208 (50%)	13.10** (1.79–96.04)	6.52** (4.38–9.69)	Mixed protective factor
Motivational						
Future orientation	0/48 (0%)	32/259 (12%)	125/394 (32%)	7.09[a] (0.95–53.10)	3.30** (2.11–4.90)	Mixed protective factor[b]
Motivation for treatment	19/310 (6%)	73/269 (27%)	65/122 (53%)	5.70** (3.34–9.75)	3.06** (1.96–4.78)	Mixed protective factor
Attitudes toward agreements and conditions	19/339 (6%)	54/223 (24%)	84/139 (60%)	5.38** (3.09–9.38)	4.78** (3.03–7.55)	Mixed protective factor
School/work	4/140 (3%)	57/346 (17%)	96/215 (45%)	6.71** (2.38–18.86)	4.09** (2.77–6.05)	Mixed protective factor
Leisure activities	0/33 (0%)	46/253 (18%)	111/415 (27%)	7.68*[a] (1.03–57.55)	1.64* (1.10–2.37)	Promotive factor[b]
Relational						
Parents/guardians	7/165 (4%)	95/421 (23%)	55/115 (48%)	6.58** (2.98–14.50)	3.15** (2.04–4.84)	Mixed protective factor
Peers	0/6 (0%)	31/188 (17%)	126/507 (25%)	1.42[a] (0.17–11.92)	1.68* (1.06–2.51)	Weak protective effect[b]
Other supportive relationships	4/44 (9%)	79/308 (21%)	74/277 (27%)	2.63 (0.91–7.56)	1.39 (0.97–2.00)	Weak protective effect
External						
Pedagogical climate	4/144 (3%)	45/352 (13%)	108/205 (53%)	5.13** (1.81–14.54)	7.60** (5.01–11.51)	Mixed protective factor

Note. P = promotive category; M = intermediate category; H = hazard category; SAPROF-YV = Structured Assessment of Protective Factors for violence risk-Youth Version.
[a]Odds ratio (*OR*) calculated by adding 1 to all relevant cells. [b]Factors with small cell size; the classification needs to be interpreted with caution.
*$p < .05$. **$p < .01$.

Table 3. Risk Factors of Probation Noncompletion.

YLS/CMI Domains	% Probation Noncompletion			*OR*		Type
	P	M	H	P	H	
Prior and current offenses/dispositions	51/370 (14%)	95/294 (32%)	9/19 (47%)	2.99** (2.04–4.38)	1.89 (0.74–4.79)	Promotive factor[a]
Family circumstances/parenting	43/328 (13%)	78/287 (27%)	34/68 (50%)	2.47** (1.64–3.74)	2.68** (1.56–4.61)	Mixed risk factor
Education/employment	9/95 (10%)	65/375 (17%)	81/213 (38%)	2.00 (0.96–4.19)	2.93** (1.99–4.30)	Hazard factor
Peer relations	6/64 (9%)	32/241 (13%)	117/378 (31%)	1.48 (0.59–3.71)	2.93** (1.90–4.51)	Hazard factor
Substance abuse	129/589 (22%)	20/71 (28%)	6/23 (26%)	1.40 (0.81–2.43)	0.90 (0.31–2.61)	Weak risk effect[a]
Leisure/recreation	7/68 (10%)	14/95 (15%)	134/520 (26%)	1.51 (0.57–3.96)	2.01* (1.10–3.66)	Weak risk effect
Personality/behavior	33/238 (14%)	106/417 (25%)	16/28 (57%)	2.12** (1.38–3.25)	3.91** (1.79–8.54)	Mixed risk factor[a]
Attitudes/orientation	14/129 (11%)	102/476 (21%)	39/78 (50%)	2.24** (1.23–4.07)	3.67** (2.24–5.02)	Mixed risk factor

Note. P = promotive category; M = intermediate category; H = hazard category; YLS/CMI = Youth Level of Service/Case Management Inventory.
[a]Factors with small cell size (<5%); the classification needs to be interpreted with caution.
*$p < .05$. **$p < .01$.

school/work ($OR = 2.52$, 95% CI = [1.53, 4.14]), and (4) PC ($OR = 4.47$, 95% CI = [2.65, 7.52]), and high levels of risks in the following YLS/CMI domains: (1) prior and current offense/disposition ($OR = 3.66$, 95% CI = [2.21, 6.08]), (2) education/employment ($OR = 2.60$, 95% CI = [1.59, 4.26]), and (3) peer relations ($OR = 2.02$, 95% CI = [1.21, 3.39]). The pseudo R^2 (Cox and Snell) for the model is 0.34. Hosmer and Lemeshow test was nonsignificant, $\chi^2(8) = 8.14$, $p = .52$. Receiver operating characteristic analysis was conducted using the predicted probability of the seven variables as the test variable following the procedures by Chan (2004). The results indicate a high area under the curve of .90 ($SE = 0.01$, $p < .01$). These statistics imply that the model has good predictive power and model fit (Pearce & Ferrier, 2000). The strongest predictor emerged from this analysis was PC.

Interactive Relationship With "Low Pedagogical Climate" as a Risk Factor

Using PC as an example, Table 4 presents the percentage of noncompletion of probation order for those with high and low PC. A list of 20 factors from SAPROF and YLS/CMI domains were tested for the booster and buffering effects.

For the promotive group with high PC, the results showed booster effects for 15 of the 20 promotive categories. For example, only 6% of the 496 youth with both PC and self-control did not complete probation successfully. In other words, self-control boosted the effects of PC for successful probation. As shown in Table 3, the booster factors with the strongest effects ($OR > 4$) were attitudes toward agreements and conditions ($OR = 6.58$), motivation for treatment ($OR = 5.19$), perseverance ($OR = 4.63$), and school/work ($OR = 4.25$) from SAPROF-YV as well as peer relations ($OR = 4.69$) and education/employment ($OR = 4.29$) from YLS/CMI.

For the hazard group with limited PC, 10 of the 20 factors showed a significant buffering effect. For example, only 24% of the 41 youth with high level of self-control but low PC failed probation, as compared to 60% of the 164 youth with low level of self-control as shown in Figure 2. In other words, high levels of self-control buffered the negative effects of low PC in predicting youth risk behavior. As shown in Table 4, the buffering factors with the strongest effects for youth under low PC include self-control ($OR = 4.60$), future orientation ($OR = 4.63$), and school/work ($OR = 4.09$) from SAPROF-YV.

None of the interaction terms reached significance at $p = .05$ level, whereas four of the interaction terms were marginally significant, indicating that most of the factors showed both booster and buffering effects while these four factors were mainly showing booster effects (social competence, positive relationship with parents/guardians, low risk in family circumstances/parenting, and personality/behavior) when there was presence of PC.

Discussion

In this article, we proposed an expansion of terminologies used in the current literature to describe risk and protective factors with the aim of clarifying and standardizing the definitions of these factors. The proposed typology was tested with a total of 701 youth offenders on probation in Singapore. Under the proposed typology, a predictor can be labeled using five terms, including promotive factor, hazard factor, mixed factor, booster factor, and buffering factor. Using probation order completion for youth offenders as an example, this study presents an in-depth examination of 21 factors as coded in the YLS/CMI and SAPROF-YV. The result showed that majority of the SAPROF-YV factors appeared as mixed protective factors and majority of the YLS/CMI domains as mixed risk factors or hazard factors, which provides some indirect evidence on the validity of these assessment tools. Differentiation of these factors could inform prevention and intervention strategies.

Table 4. Booster and Buffering Factors for Pedagogical Climate on Probation Noncompletion.

Booster/Buffering Factor	High Pedagogical Climate			Low Pedagogical Climate			Interaction (Wald Test)	Type
	PP	PH	Booster *OR*	HP	HH	Buffering *OR*		
SAPROF-YV								
Social competence	29/399 (7%)	20/97 (21%)	3.31**	56/117 (48%)	52/88 (59%)	1.57	3.06†	Booster
Coping	21/320 (7%)	28/176 (16%)	2.69**	8/24 (33%)	100/181 (55%)	2.47*	0.02	Both
Self-control	49/496 (6%)	35/243 (14%)	2.87**	10/41 (24%)	98/164 (60%)	4.60**	0.83	Both
Perseverance	29/418 (7%)	20/78 (26%)	4.63**	25/75 (33%)	83/130 (64%)	3.53**	0.37	Both
Future orientation	15/245 (6%)	34/251 (14%)	2.40**	17/62 (27%)	91/143 (64%)	4.63**	1.99	Both
Motivation for treatment	35/450 (8%)	14/46 (30%)	5.19**	57/129 (44%)	51/76 (67%)	2.58**	2.18	Both
Attitudes toward agreements and conditions	37/463 (8%)	12/33 (36%)	6.58**	36/99 (36%)	72/106 (68%)	3.71**	1.33	Both
School/work	24/383 (6%)	25/113 (22%)	4.25**	37/103 (36%)	71/102 (70%)	4.09**	0.01	Both
Leisure activities	12/210 (6%)	37/286 (13%)	2.45**	34/76 (45%)	74/129 (57%)	1.66	0.74	Booster
Parents/guardians	44/475 (9%)	5/21 (24%)	3.06*	58/111 (52%)	50/94 (53%)	1.04	3.19†	Booster
Peers	11/150 (7%)	38/346 (11%)	1.56	20/44 (46%)	88/161 (55%)	1.45	0.02	Neither
Other supportive relationships	29/319 (9%)	20/177 (11%)	1.27	54/105 (51%)	54/100 (54%)	1.11	0.11	Neither
YLS/CMI								
Prior and current offenses/dispositions	13/275 (5%)	35/204 (17%)	4.17**	38/95 (40%)	69/109 (63%)	2.59**	1.15	Both
Family circumstances/parenting	12/256 (5%)	36/223 (16%)	3.91**	31/72 (43%)	76/132 (58%)	1.80*	2.92†	Both
Education/employment	20/345 (6%)	28/134 (21%)	4.29**	54/125 (43%)	53/79 (67%)	2.68*	1.18	Both
Peer relations	9/233 (4%)	39/246 (16%)	4.69**	29/72 (40%)	78/132 (59%)	2.14*	2.61	Both
Substance abuse	41/418 (10%)	7/61 (11%)	1.19	88/171 (52%)	19/33 (58%)	1.28	0.02	Neither
Leisure/recreation	6/125 (5%)	42/354 (12%)	2.67*	15/38 (40%)	92/166 (55%)	1.91†	0.34	Booster
Personality/behavior	9/189 (5%)	39/290 (13%)	3.11**	24/49 (49%)	83/155 (54%)	1.20	3.56†	Booster
Attitudes/orientation	4/103 (4%)	44/376 (12%)	3.28*	10/26 (39%)	97/178 (55%)	1.92	0.61	Booster

Note. SAPROF-YV = Structured Assessment of Protective Factors for violence risk-Youth Version; YLS/CMI = Youth Level of Service/Case Management Inventory; PP = promotive category for both factors; HH = hazard category for both factors; PH = promotive category for pedagogical climate, with hazard category for the booster/buffering factor; HP = hazard category for pedagogical climate, with promotive category for the booster/buffering factor.
*$p < .05$. **$p < .01$. †$p < .10$.

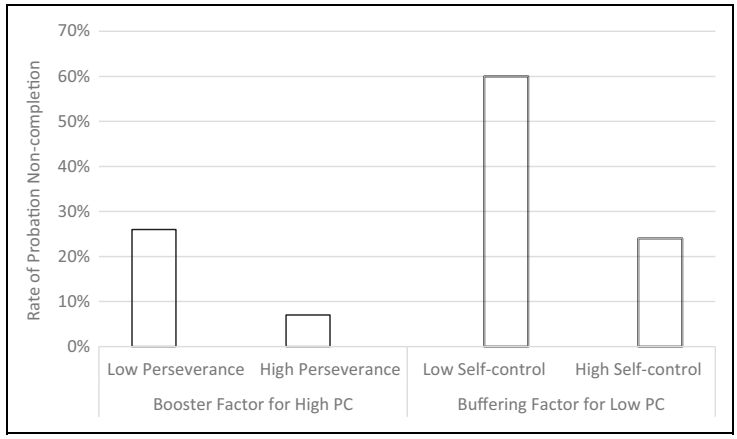

Figure 2. Examples of booster and buffering factors for pedagogical climate.

Mixed, Promotive, and Hazard Factors

Based on the definition of mixed factors, they are linearly related to the outcome. For example, a mixed protective factor is supposed to be linearly and positively associated with positive outcomes. The implication for labeling a factor as "mixed factor" is that the intervention could target on youth with different levels of protection/risk at the same time. For example, consistent with the findings of Farrington et al. (2016), PC, which refers to the structure, supervision, and support of the juvenile's living environment, was found to have both strong promotive effect and risk effect in this study. For youth with low PC, their outcomes may change for the better if they could have a moderate level of such supervision. For youth who already have some supervision, they may achieve better result if the level of supervision is further increased. In other words, interventions on mixed risk factors for the moderate-risk youth are as necessary as for the high-risk youth. Once identified as significant mixed factors, the interventions on these factors can be conducted flexibly on different levels.

As compared to mixed factors, promotive and hazard factors are not linearly related to the outcome. For promotive factors, the differences between the intermediate and the hazard categories are nonsignificant. Take prior and current offenses/dispositions (YLS/CMI) as an example, the chance of not completing probation orders was similar for those with moderate and high levels of prior offenses. It implied that the target of intervention should focus on preventing youth involvement in crime and diverting them away from the criminal justice system. Another promotive factor found in this study was leisure activities (SAPROF-YV). There was a significant increase in the probation noncompletion rate from those with clear evidence of structured leisure activities (0%) to those with some presence of such activities (18%). These findings indicated that promotive factors would be most useful at the highest protective level. Targeting interventions to improve promotive factors from moderate to high level may thus produce the best outcomes.

For hazard factors, the promotive and the intermediate categories are not significantly different. One example of hazard factors found in this study was peer relations (YLS/CMI), which was consistently found to be a risk factor for problem behaviors (Garnier & Stein, 2002). In the present study, the chance of noncompletion of probation order was much higher for youth with high risk in the peer category (31%) as compared to those in the moderate risk category (13%). It suggested that interventions on hazard factors should focus on youth assessed to be at high risk with the aim to reduce the risk to a moderate level. Another hazard factor found in this study was lack of self-control (SAPROF-YV), which, according to the general theory of crime, is one of the most important predictor of crime (Gottfredson & Hirschi, 1990; Pratt & Cullen, 2000). The result showed a

significant decrease in noncompletion of probation order from 33% for those with low self-control to 9% for those with moderate self-control. A similar trend was observed for social competence and coping (SAPROF-YV). Similarly, the intervention could target to increase the youth's resilience in these areas from low to (at least) moderate level.

Booster and Buffering Factors

Two terms were used in this article to describe the booster and buffering effects between two predictors. A booster protective factor is positively associated with positive outcomes with the presence of another protective factor. One example of protective boosters found in this study was positive attitudes toward agreements and conditions (SAPROF-YV). For youth with high levels of PC but low levels of positive attitudes, the rate of noncompletion was 36%. But for those with both high levels of PC and positive attitudes, the rate of noncompletion was only 8%. The result implied that interventions might be effective by improving these youth's attitudes to further boost the protective effect of PC. In this article, the result showed that 15 of the 20 factors examined had a booster effect for PC. For these youth, improvement on at least one of these booster protective factors may further increase probation success. Special focus should be placed on these youths to improve their perseverance, motivation for treatment, and attitudes toward agreements and conditions and to reduce their behavioral problems at school and their association with delinquent peers.

On the other hand, a buffering factor is positively associated with positive outcomes with the presence of risks. For example, it was found in this study that bonding to school/work (SAPROF-YV) was a buffering factor for lack of PC. The rate of noncompletion was as high as 70% for those without both protection but reduced to 36% if bonding to school/work was present. The result thus indicated that interventions to improve the youth's bonding to school/work might help to increase probation success for those with low PC. This study found 10 factors with significant buffering effects. Therefore, interventions for youth with low PC could be focused on these areas to improve their self-control, future orientation, motivation for treatment, and attitudes toward agreements and conditions as well as to promote involvement in school and reduce involvement with delinquent peers. Such findings speak about the necessity to continually keep the youth engaged in school or employment. These not only serve as important touch points for professionals to engage the youth in meaningful activities through a strength-based approach, build mastery, and a future orientation but also allow the professionals to influence them to desist from crime (see, e.g., Chu & Ward, 2015; Ward & Mann, 2004).

The results also showed that the effects of these buffering and booster factors were not significantly different in strength and direction across the youth with high or low PC. In other words, these factors provided similar protective effects regardless of the presence of PC. A few factors may have mainly booster effects for PC. An example was positive relationship with parents/guardians. This factor showed mainly booster effect when PC was present but no buffering effects when PC was lacking. For youth with limited PC, the noncompletion rate was similarly high even the relationship with parents was positive. This finding is consistent with parenting literature in that both support and control are important dimensions of quality parenting behavior to reduce child delinquency (Hoeve et al., 2009). Our findings implied that treatment programs that only aimed at improving parent–child relationships may not be as effective if supervision skills were not targeted in the program. This is a particular important distinction within the local context considering the family circumstances and parenting were found to be the biggest predictor of recidivism in youth offenders (Chu et al., 2015), and that family dysfunctionality as well as criminality were associated with youth offenders being arrested and charged at a younger age (Chng, Chu, Zeng, Li, & Ting, 2016). To address this aspect, implementing targeted interventions such as the Functional Family Therapy may be useful in improving (a) the family functioning of the youth probationers, (b) the interactions between the youth probationers and their parents, as well as (c) reducing the psychological distress within their

families—these have been shown to have impact on longer-term outcomes in other jurisdictions (see, e.g., Aos et al., 2011; Gan, Zhou, Hoo, Chong, & Chu, 2018).

In summary, not all risk and protective factors are identical in the way of impacting youth offenders. Different factors could exert their influences through different mechanisms, either directly or indirectly, as well as linearly or nonlinearly. It is thus imperative to structure sensitive and responsive interventions that would increase resilience or social capital in accordance with the insights derived from this study, so that our interventions can be more targeted to achieve better efficacy.

Limitations

This study shared the limitations of studies using retrospective chart review method which is commonly used in clinical research (Abel Ickowicz, 2006). The main limitation is the possible absence of relevant files or missing information in the files as data were not recorded for research purposes in the first place. Measures were taken in this study to overcome the main methodological problems using this design (Matt & Matthew, 2013). For example, two release cohorts of probation cases were used to avoid sampling and power issues. All relevant case files were used in the coding process to provide as much information as possible. The operationalization of all variables was strictly following the instructions in the YLS/CMI and SAPROF-YV manuals. Training of research assistants (i.e., coders) were conducted by an experienced trainer. The coding process was carefully monitored, and adequate IRRs were achieved in the study. To ensure the temporal relationships between the predictors and outcomes as well as to reduce rater bias in the coding process, all predictors from the two assessment instruments were coded based only on the information obtained during presentence stage, and the raters were blind to the outcome at the time of coding for the risk and protective factors. Subsequently, the probation completion outcome was coded based on the release reports.

Another limitation was that no gender difference was examined in the current study, due to the small numbers for the female group who had noncompletion status. In the current sample, only 92 of the 609 youth probationers were females, of which only 22 did not complete the probation order. Further split this group by low risk, moderate risk, and high risk (or protection) resulted in many zero counts. Though previous research indicated possible gender differences in risk factors in Singapore, the findings need to be backed up by more empirical studies (Chu et al., 2014).

Despite the efforts in reducing the methodological issues, the present study was not set up to examine the causal factors for probation completion. The analyses were mainly conducted to illustrate the different types of risk and protective factors. Therefore, some results should be interpreted with caution especially for the categories with small sample size. Nonetheless, the multivariate logistic regression model of seven significant factors had good predictive power for probation success. These factors cover the important areas of offense history, attitudes, school, and family, which are consistent with previous recidivism studies in both youth and adult offenders (Cottle, Lee, & Heilbrun, 2001; Gendreau, Little, & Goggin, 1996). In other words, the current study showed similar results with Western-based studies and reflected potentially more universal risk and protective factors across the globe.

Conclusion

The study examined the utilities of a proposed typology of risk and protective factors using two common risk-assessment and protection-assessment tools. Our present results showed that these factors can be classified into mixed protective factors (e.g., school/work), mixed risk factors (e.g., negative attitude/orientation), promotive factors (e.g., leisure activities), hazard factors (e.g., delinquent peer relations), booster factors (e.g., perseverance on top of PC), and buffering factors (e.g., self-control against the lack of PC). Future studies on risk and protective factors are needed to replicate the findings to better inform prevention and intervention programs for youth offender population.

Appendix

Table A1. Descriptions of SAPROF-YV Items.

Factors	Descriptions
Resilience social competence	The ability to perceive, interpret, and process social information as well as the ability to act in a socially appropriate way
Coping	The skills to deal with stressful situations or problems, such as seeking support, adequately expressing emotions, and remain optimistic
Self-control	The ability to control emotions, desires, and behavior, including the ability to keep calm in difficult situations and resist temptations
Perseverance	The determination to fulfill intended personal goals and the ability to keep going despite discouragement, setbacks, or difficulties
Motivational future orientation	The positive view of the future and the explicit efforts to pursue and achieve future goals.
Motivation for treatment	The intrinsic motivation to change and the degree to which they are open and willing to alter problematic behavior
Attitudes toward agreements and conditions	The respect for authority figures and compliance with rules, regulations, agreements, and conditions
School/work	The feelings of connectedness to school or work, commitment to and engagement in school or work, and their school achievement or job performance
Leisure activities	The involvement in social, structured, and organized leisure activities with other youth and under the supervision of a prosocial adult
Relational parents/guardians	The presence of a positive and warm parent–child relationship, characterized by affection, support, care, love, nurturance, and mutual acceptance
Peers	The presence of established relationship with and received social support from prosocial peers or friends
Other supportive relationships	The presence of prosocial and supportive relationship other than those with parents, guardians, or peers
External pedagogical climate	The involvement, support, supervision, and consistent structure of the living environment offered by parents/guardians and/or professionals

Table A2. Descriptions of YLS/CMI Domains.

YLS/CMI Domains	Descriptions
Prior and current offenses/ dispositions	The criminal history of the youth offender, including prior convictions, failure to comply, and prior probation or custody
Family circumstances/ parenting	The presence of poor relationship between youth offenders and their parents as well as inadequate parental supervision and inappropriate discipline
Education/employment	The involvement in problematic educational or employment activities, including the presence of disruptive behavior on school or work premises, problem with peers/coworkers and teachers/supervisors, and so on.
Peer relations	The presence of delinquent acquaintances or friends as well as the lack of positive acquaintances or friends
Substance abuse	Occasional or chronic use of drug or alcohol and whether it is associated with antisocial activities and contributes to violations of the law or breach of orders
Leisure/recreation	The lack of involvement in prosocial organized activities and interests of a positive nature
Personality/behavior	The personality and behavioral patterns related to antisocial behavior and psychiatric diagnosis that has clear and significant connection to criminal activity, such as inflated self-esteem, poor frustration tolerance, and inadequate guilt feelings
Attitudes/orientation	The nonconventional antisocial beliefs, values, and procriminal attitudes

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Note

1. Total population of 5.47 million includes Singapore residents and nonresidents. Singapore's resident population is about 3.87 million, of which 74.3% are Chinese, 13.3% are Malays, 9.1% are Indians, and 3.3% are of other races.

References

Abel Ickowicz, M. (2006). A methodology for conducting retrospective chart review research in child and adolescent psychiatry. *Journal of Canadian Academy of Child and Adolescent Psychiatry*, *15*, 126–134.

Andrews, D. A., Bonta, J., & Wormith, J. S. (2006). The recent past and near future of risk and/or need assessment. *Crime and Delinquency*, *52*, 7–27.

Aos, S., Lee, S., Drake, E., Pennucci, A., Klima, T., & Miller, M., . . . Burley, M. (2011). *Return on investment: Evidence-based options to improve statewide outcomes*. Olympia, WA: Washington State Institute for Public Policy.

Bonta, J., & Andrews, D. A. (2017). *The psychology of criminal conduct*. New York, NY: Routledge.

Borum, R., Bartel, P., & Forth, A. (2006). *Manual for the structured assessment of violence risk in youth*. Tampa, FL: University of South Florida.

Chan, Y. (2004). Biostatistics 202: Logistic regression analysis. *Singapore Medical Journal*, *45*, 149–153.

Chng, G. S., Chu, C. M., Zeng, G., Li, D., & Ting, M. H. (2016). A latent class analysis of family characteristics linked to youth offending outcomes. *Journal of Research in Crime and Delinquency*, *53*, 765–787.

Chu, C. M., Lee, Y., Zeng, G., Yim, G., Tan, C. Y., Ang, Y., Chin, S., & Ruby, K. (2015). Assessing youth offenders: The predictive validity of YLS/CMI ratings in a non-Western context. *Psychological Assessment*, *27*, 1013–1021.

Chu, C. M., Thomas, S. D., Ogloff, J. R., & Daffern, M. (2013). The short- to medium-term predictive accuracy of static and dynamic risk assessment measures in a secure forensic hospital. *Assessment*, *20*, 230–241.

Chu, C. M., & Ward, T. (2015). The good lives model of offender rehabilitation: Working positively with sexual offenders. In N. Ronel & D. Segev (Eds.), *Positive criminology: The good can overcome the bad* (pp. 140–161). Abingdon, UK: Routledge.

Chu, C. M., Yu, H., Lee, Y., & Zeng, G. (2014). The utility of YLS/CMI-SV for assessing youth offenders in Singapore. *Criminal Justice and Behavior*, *41*, 1437–1457.

Chua, J. R. Z. H., Chu, C. M., Yim, G., Chong, D., & Teoh, J. (2014). Implementation of the Risk-Need-Responsivity framework within the juvenile justice agencies in Singapore. *Psychiatry, Psychology, and Law*, *21*, 877–889.

Cottle, C. C., Lee, R. J., & Heilbrun, K. (2001). The prediction of criminal recidivism in juveniles a meta-analysis. *Criminal Justice and Behavior*, *28*, 367–394.

Criminal Procedure Code of 2012, Singapore Statues, Chapter 68. Retrieved from https://sso.agc.gov.sg/Act/CPC2010

de Vogel, V., de Ruiter, C., Bouman, Y., & de Vries Robbé, M. (2009). *Guidelines for the assessment of protective factors for violence risk* (English Version). Utrecht, the Netherlands: Forum Educatief.

de Vries Robbé, M., de Vogel, V., & de Spa, E. (2011). Protective factors for violence risk in forensic psychiatric patients: A retrospective validation study of the SAPROF. *International Journal of Forensic Mental Health*, *10*, 178–186.

de Vries Robbé, M., de Vogel, V., Koster, K., & Bogaerts, S. (2015). Assessing protective factors for sexually violent offending with the SAPROF. *Sexual Abuse: A Journal of Research and Treatment*, *27*, 51–70.

de Vries Robbé, M., & Willis, G. M. (2017). Assessment of protective factors in clinical practice. *Aggression and Violent Behavior*, *32*, 55–63.

Douglas, K. S., & Skeem, J. L. (2005). Violence risk assessment: Getting specific about being dynamic. *Psychology, Public Policy, and Law*, *11*, 347.

Dubow, E. F., Huesmann, L. R., Boxer, P., & Smith, C. (2016). Childhood and adolescent risk and protective factors for violence in adulthood. *Journal of Criminal Justice*, *45*, 26–31.

Farrington, D. P., & Ttofi, M. M. (2011). Protective and promotive factors in the development of offending. In T. Bliesener, A. Beelmann & M. Stemmler (Eds.), *Antisocial behavior and crime: Contributions of developmental and evaluation research to prevention and intervention* (pp. 71–88): Boston, MA: Hogrefe.

Farrington, D. P., Ttofi, M. M., & Piquero, A. R. (2016). Risk, promotive, and protective factors in youth offending: Results from the Cambridge study in delinquent development. *Journal of Criminal Justice*, *45*, 63–70.

Fazel, S., Singh, J. P., Doll, H., & Grann, M. (2012). Use of risk assessment instruments to predict violence and antisocial behaviour in 73 samples involving 24,827 people: Systematic review and meta-analysis. *British Medical Journal*, *345*, e4692.

Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health*, *26*, 399–419.

Gan, D. Z. Q., Zhou, Y., Hoo, E. C. C., Chong, D., & Chu, C. M. (2018). The implementation of functional family therapy as an intervention for youth probationers in Singapore. *Journal of Marital and Family Therapy*. Manuscript submitted for publication.

Garnier, H. E., & Stein, J. A. (2002). An 18-year model of family and peer effects on adolescent drug use and delinquency. *Journal of Youth and Adolescence*, *31*, 45–56.

Gendreau, P., Little, T., & Goggin, C. (1996). A meta-analysis of the predictors of adult offender recidivism: What works! *Criminology*, *34*, 575–608.

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Palo Alto, CA: Stanford University Press.

Harrendorf, S., Heiskanen, M., & Malby, S. (2010). International Statistics on Crime. *Development Research Group, World Bank*. Retrieved from https://www.unodc.org/documents/data-and-analysis/Crime-statistics/International_Statistics_on_Crime_and_Justice.pdf.

Hoeve, M., Dubas, J. S., Eichelsheim, V. I., Van Der Laan, P. H., Smeenk, W., & Gerris, J. R. (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of Abnormal Child Psychology*, *37*, 749–775.

Hoge, R. D., & Andrews, D. A. (2011). *Youth Level of Service/Case Management Inventory 2.0 (YLS/CMI 2.0): User's manual.* Toronto, Canada, Multi-Health Systems.

Jessor, R., Turbin, M. S., Costa, F. M., Dong, Q., Zhang, H., & Wang, C. (2003). Adolescent problem behavior in China and the United States: A cross-national study of psychosocial protective factors. *Journal of Research on Adolescence*, *13*, 329–360.

Jolliffe, D., Farrington, D. P., Loeber, R., & Pardini, D. (2016). Protective factors for violence: Results from the Pittsburgh Youth Study. *Journal of Criminal Justice*, *45*, 32–40.

Jolliffe, D., Farrington, D. P., Piquero, A. R., MacLeod, J. F., & van de Weijer, S. (2017). Prevalence of life-course-persistent, adolescence-limited, and late-onset offenders: A systematic review of prospective longitudinal studies. *Aggression and Violent Behavior*, *33*, 4–14.

Kraemer, H. C., Kazdin, A. E., Offord, D. R., Kessler, R. C., Jensen, P. S., & Kupfer, D. J. (1997). Coming to terms with the terms of risk. *Archives of General Psychiatry*, *54*, 337–343.

Lai, V., Zeng, G., & Chu, C. M. (2016). Violent and nonviolent youth offenders: Preliminary evidence on group subtypes. *Youth Violence and Juvenile Justice*, *14*, 313–329.

Loeber, R., Farrington, D. P., Stouthamer-Loeber, M., & White, H. R. (2008). *Violence and serious theft: Development and prediction from childhood to adulthood*. New York, NY: Routledge.

Matt, V., & Matthew, H. (2013). The retrospective chart review: Important methodological considerations. *Journal of Educational Evaluation for Health Professions*, *10*, 12–19.

McAra, L., & McVie, S. (2016). Understanding youth violence: The mediating effects of gender, poverty and vulnerability. *Journal of Criminal Justice*, *45*, 71–77.

McGrath, A., & Thompson, A. P. (2012). The relative predictive validity of the static and dynamic domain scores in risk-need assessment of juvenile offenders. *Criminal Justice and Behavior*, *39*, 250–263.

Ministry of Social and Family Development. (2017). Juvenile delinquents: Juveniles arrested. Retrieved from https://www.msf.gov.sg/research-and-data/Research-and-Statistics/Pages/Juvenile-Delinquents-Juveniles-Arrested.aspx

Monahan, J., & Skeem, J. L. (2016). Risk assessment in criminal sentencing. *Annual Review of Clinical Psychology*, *12*, 489–513.

Nivette, A. E. (2011). Cross-national predictors of crime: A meta-analysis. *Homicide Studies*, *15*, 103–131.

Onifade, E., Davidson, W., Campbell, C., Turke, G., Malinowski, J., & Turner, K. (2008). Predicting recidivism in probationers with the Youth Level of Service/Case Management Inventory (YLS/CMI). *Criminal Justice and Behavior*, *35*, 474–483.

Pearce, J., & Ferrier, S. (2000). Evaluating the predictive performance of habitat models developed using logistic regression. *Ecological Modelling*, *133*, 225–245.

Posick, C., & Rocque, M. (2015). Family matters: A cross-national examination of family bonding and victimization. *European Journal of Criminology*, *12*, 51–69.

Pratt, T. C., & Cullen, F. T. (2000). The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminology*, *38*, 931–964.

Rennie, C. E., & Dolan, M. C. (2010). The significance of protective factors in the assessment of risk. *Criminal Behaviour and Mental Health*, *20*, 8–22.

Schmidt, F., Campbell, M. A., & Houlding, C. (2011). Comparative analyses of the YLS/CMI, SAVRY, and PCL:YV in adolescent offenders: A 10-year follow-up into adulthood. *Youth Violence and Juvenile Justice*, *9*, 23–42.

Singapore Department of Statistics. (2015). *Yearbook of statistics 2015*. Retrieved from http://www.singstat.gov.sg/docs/default-source/default-document-library/publications/publications_and_papers/reference/yearbook_2015/yos2015.pdf

Singapore Police Force. (2017). *Annual crime brief 2016*. Retrieved from https://www.police.gov.sg/∼/media/spf/files/statistics/20170210_annual_crime_brief_2016.pdf

Singh, J. P., Grann, M., & Fazel, S. (2011). A comparative study of violence risk assessment tools: A systematic review and metaregression analysis of 68 studies involving 25,980 participants. *Clinical Psychology Review*, *31*, 499–513.

Takahashi, M., Mori, T., & Kroner, D. G. (2013). A cross-validation of the Youth Level of Service/Case Management Inventory (YLS/CMI) among Japanese juvenile offenders. *Law and Human Behavior*, *37*, 389–400.

Teo, M. (2010, June 5). Singapore's policy keeps drugs at bay. *The Guardian*. Retrieved from https://www.theguardian.com/commentisfree/2010/jun/05/singapore-policy-drugs-bay

Ttofi, M. M., Farrington, D. P., Piquero, A. R., & DeLisi, M. (2016). Protective factors against offending and violence: Results from prospective longitudinal studies. *Journal of Criminal Justice*, *45*, 1–3.

Vagi, K. J., Rothman, E. F., Latzman, N. E., Tharp, A. T., Hall, D. M., & Breiding, M. J. (2013). Beyond correlates: A review of risk and protective factors for adolescent dating violence perpetration. *Journal of Youth and Adolescence*, *42*, 633–649.

Vazsonyi, A. T., Chen, P., Jenkins, D. D., Burcu, E., Torrente, G., & Sheu, C. J. (2010). Jessor's problem behavior theory: Cross-national evidence from Hungary, the Netherlands, Slovenia, Spain, Switzerland, Taiwan, Turkey, and the United States. *Developmental Psychology*, *46*, 1779–1791.

Ward, T., & Mann, R. (2004). Good lives and the rehabilitation of offenders: A positive approach to treatment. In A. Linley & S. Joseph (Eds.), *Positive psychology in practice* (pp. 598–616). New York, NY: John Wiley.

White, J. L., Moffitt, T. E., & Silva, P. A. (1989). A prospective replication of the protective effects of IQ in subjects at high risk for delinquency. *Journal of Consulting and Clinical Psychology*, *57*(6), 719–724.

World Health Organization. (2016). *Youth violence fact sheet*. Retrieved from http://www.who.int/mediacentre/factsheets/fs356/en/

Yang, M., Wong, S. C., & Coid, J. (2010). The efficacy of violence prediction: A meta-analytic comparison of nine risk assessment tools. *Psychological Bulletin*, *136*, 740–767.

Zeng, G., Chu, C. M., & Lee, Y. (2015). Assessing protective factors in youth who sexually offended in Singapore: Preliminary evidence on the utility of the DASH-13 and SAPROF. *Sexual Abuse: A Journal of Research and Treatment*, *27*(1), 91–108.

Author Biographies

Dongdong Li, PhD, is a principal research specialist at the Centre for Research on Rehabilitation and Protection (CRRP), Ministry of Social and Family Development (MSF), Singapore. Her research involves the study of child protection issues and youth offender rehabilitation. She also studies media effects on child development.

Chi Meng Chu, PhD, is a senior principal clinical and forensic psychologist, and a deputy director at MSF. He is also an adjunct associate professor with the National University of Singapore. His research interests include youth offending and child protection issues.

Xuexin Xu, PhD, is a research specialist with CRRP. Her research interests span both psychology and communication studies. Her current research focuses on issues related to juvenile delinquency, such as risk and protective factors for youth offenders and cycle of violence.

Gerald Zeng, PhD, formerly worked as a senior research specialist with CRRP. He is currently an independent researcher and carries out research in youth offending and rehabilitation.

Kala Ruby, is an assistant manager at the Information Management & Research and Evaluation, within Probation and Community Rehabilitation Service, MSF. She is interested in evidence-based practice in successful rehabilitation of youth probationers.