A Latent Class Analysis of Family Characteristics Linked to Youth Offending Outcomes

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Abstract
Objectives: There were two aims to this study: firstly, to identify family subtypes of Singaporean youth offenders based on eight family variables. Secondly, the associations of these family subtypes with youth offending outcomes were tested. Methods: With a sample of 3,744 youth, a latent class analysis was first conducted based on eight family variables. Multivariate analyses and a Cox regression were subsequently performed to analyze the associations of the family classes with age at first arrest, age at first charge, and recidivism. Results: A three-class solution was found to have the best fit to the data: (1) intact functioning families had little family risk; (2) families with criminality had higher probabilities of family criminality, of drug/alcohol abuse, and of being nonintact; and (3) poorly managed families received the poorest parenting and were more likely to be

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nonintact. Youth offenders from the latter two classes were arrested and charged at younger ages. Additionally, they reoffended at a quicker rate. Conclusions: Family backgrounds matter for youth offending outcomes. Interventions have to be multifaceted and targeted at the family in order to mitigate the risk of young offenders from developing into pathological adult criminals.

Keywords
youth offending, family factors, latent class analysis

Introduction
Youth offending is a costly societal problem that receives great attention due to concerns on many levels: It challenges our belief in childhood innocence, generates fear of lawlessness and effects of a breakdown in socialization, and questions the quality of our services and our investment in future generations (Armstrong 2004). Extensive research has been conducted and forms a well-established literature base on youth offending. However, majority of these studies were conducted in western countries such as the United States, England, and Australia, where the crime rates are above the global highest quartile despite a general decreasing trend in juvenile arrest rate in recent years (Harrendorf, Heiskanen, and Malby 2010). Numerous studies have documented the risk factors for youth offending and recidivism, among which offense history and family problems are the strongest predictors (Cottle, Lee, and Heilbrun 2001). Interestingly, few studies have been carried out in countries or places with low crime rate. It would be especially useful to explore the mechanisms under which such countries could maintain a low rate of youth crime.

As a first step, this article examines how common family risk factors are related to youth offending recidivism in Singapore; a cosmopolitan country where the crime rate is among the lowest in the world and its multiracial harmony is recognized as a model of racial integration. In the globalized economy, the characteristics of a multiracial society with a blend of value systems reflect the changing demographics of many developed countries who are facing an influx of migrants. Hence, understanding how crime works in Singapore may also bring new insights to youth offending in places with such demographics.
The Singaporean Family and Offending

As compared to the United States, the Singaporean family has significantly different family structures. In the last five decades, the Singaporean family has been moving toward smaller household size, lower fertility rate, and higher divorce rate. According to the U.S. Census Bureau, the proportion of nuclear families in the United States dropped to less than a quarter since 2001. In comparison, Singapore still has it as the most dominant household structure today, though the proportion of nuclear families has also fallen from 66 percent in 1990 to 49 percent in 2014 (Singapore Ministry of Social and Family Development Statistical Series 2015). The rate of divorce in Singapore has also risen in the last three decades, but its rate of 1.9 per 1,000 resident population (Department of Statistics Singapore 2015) is still lower as compared to 3.6 in the United States.

Family systems theory informs us that what affects one individual affects the entire family system and what affects the system affects each member as well (Vakalahi 2001). Therefore, the effects of parental problems such as divorce, marital conflict, high work stress, and so on, are often not contained to the parent but spills over into the surrounds of the child. As the Singaporean society changes with increased globalization, urbanization, higher social aspirations, and two-working-parent families, the effects of these changes impact upon family lives and the upbringing of the younger generation. Past research has demonstrated that if the family is disrupted, maladaptive, or dysfunctional, there could be early emergence of conduct problems in childhood and serious delinquent behaviors during adolescence.

The rate of crime in Singapore is low, but youth offenders account for 18 percent of total persons arrested, with the three most common offenses committed by youths to be shop theft, rioting, and other thefts (Singapore Police Force 2014). It is thus the aim of the current study to understand the unique role that family plays in youth offending in Singapore.

Intergenerational transmission of offending. Ang and Huan (2008) found that in a sample of 772 Singaporean adolescent offenders, the odds for the outcome of recidivism was 128 percent higher for those with reported father criminality as compared to those without. As compared to Singapore, Western research on transmission of criminality is far more advanced in terms of the volume and quality of research on this topic. The analysis of multigenerational longitudinal data has provided evidence for the transmission of criminality across generations and the high concentration of criminality within
families (Bijleveld and Wijkman 2009; Dong and Krohn 2015; Farrington 2002; Farrington, Barnes, and Lambert 1996; Farrington et al. 2001; Van de Rakt et al. 2010). Using conviction data of five generations, a Dutch study found that parental conviction increases the risk of offspring conviction (Bijleveld and Wijkman 2009; Thornberry et al. 2003), though intergenerational transmission has been found to be stronger for violent as compared to nonviolent convictions (Van de Weijer, Bijleveld, and Blokland 2014). Adverse effects of parental criminality may be transmitted directly to offspring through genetic mechanisms or increased exposure to risk and crime (Farrington 2002) or indirectly through ineffective parenting practices (Menard et al. 2015; Thornberry et al. 2003), increased exposure to risk and crime, and increased bias and supervision of official agencies ensuring public safety (Besemer, Farrington, and Bijleveld 2013; Farrington 2002). On top of parental criminality, parental incarceration is found to result in more adverse outcomes up to 48 years of age (Murray and Farrington 2005, 2008a, 2008b).

Additionally, the presence of siblings is significant to delinquency (Altonji, Cattan, and Ware 2013; Miller and Volk 2002), perhaps due to competition for limited family resources. Criminal behavior of siblings is found to be strongly correlated (Miller and Volk 2002; Van De Rakt, Nieuwbeerta, and Apel 2009), with stronger correlations among same-sex as compared to opposite-sex siblings (Rowe and Farrington 1997). Siblings directly learn and receive reinforcements in attitudes and behaviors from each other, but this association has also been postulated to be spurious due to mutual delinquent peers or similar exposure to parents (Van De Rakt et al. 2009).

**Familial disruptions.** Records of the family profile of young offenders in Singapore revealed that among youth arrestees or those in respect of whom a beyond parental control order1 was made in 2013 and 2014 showed that 53 percent came from families in which the parents were either separated or divorced. As mentioned, there has been a rising number of divorces in Singapore, signifying the rise in disrupted families. Parental divorce is often accompanied by multiple changes in life circumstances, such as a change in living standard and environment, the remarriage of a parent, and formation of new family compositions (Pagani et al. 1998). These multiple changes have adverse effects, as children must cope with changes in relationships, domestic rules, and family lifestyles. Parenting practices are disrupted, parent–child relationships are affected, and parent–child conflict often increases (Coughlin and Vuchinich 1996; Lansford 2009). Family
The environment remains less cohesive after divorce (Kurtz 1994). The children of divorced parents have been found to be at higher risk of deviant and delinquent behaviors, poorer school achievement, and more problems in social relationships; additionally, these problems have been found to extend till adulthood (Lansford 2009; Pagani et al. 1998; Vanassche et al. 2014).

**Parenting and Conflict in Intact Families**

Among intact families, interparental conflict has also been shown to be harmful, and children can be better off after a parental divorce that reduces the conflict level (Amato, Loomis, and Booth 1995). Conflict within the family deters parental involvement and support for children (Biglan and Smolkowski 2002) and can be detrimental to the child’s self-esteem and mental health, hence making it conducive to delinquency and recidivism (Agnew et al. 2002; Cheung, Ngai, and Ngai 2007). In Singapore, Lai, Zeng, and Chu (2015) found significant differences in family circumstances and parenting backgrounds between youth offenders who committed non-violent crimes and those who committed only violent crimes. Kee et al. (2003) found that Singaporean gang youths had less open mother–child communication and more controlling mothers in a sample of gang youths as compared to nongang-affiliated youths, but father characteristics surfaced to be insignificant in gang involvement. Interestingly, Chu, Daffern, et al. (2015) in a sample of 168 youth offenders found no difference in the family connectedness between those with gang involvement histories and those who did not.

**Current Study**

To date, Singaporean studies that have investigated familial factors in relation to youth offending often utilize a handful of familial factors. In order to gain a more comprehensive understanding of youth offending in relation to the family, the first objective of the current study was to examine familial backgrounds per se in the Singaporean youth offending population through the incorporation of a wider range of familial variables as compared to previous studies. These variables encompass family criminality, divorced families, marital conflict, and poor parenting.

Unlike past research that often utilized a variable-oriented approach through the examination of a limited number of individual familial factors and expressed results in terms of variable effects or relationship, the current study was interested to first identify the distinct profiles of families, if any,
which existed among the youth offenders based on eight familial variables. Therefore, a person-oriented approach was suitable, as it not only allows for the identification of aggregate-level general patterns but is also able to capture patterns that were unique and not common. Family processes often have sequential or and reciprocal impact on each other, which aligns with an assumption of the person-oriented approach that development cannot be fully understood by examining single factors in isolation from their relationships with other interacting factors (Magnusson 1995, 1998). Offspring criminality has been associated with numerous familial risk factors such as parental criminality, parental drug abuse, parental divorce and remarriage, abuse, poor monitoring and supervision, interparental violence, and large family size (see Farrington 2015), and with biological factors such as birth complications and neurological deficits (Liu 2011). Many of these factors have been shown to interact with each other, such as the association between parental criminality and various risk factors, in that delinquent fathers more often had extramarital children, had children at a younger age, and married (and divorced) more often (Van de Rakt, Nieuwbeerta, and De Graff 2008). As family backgrounds can exhibit great heterogeneity, the person-oriented approach maximizes within-class similarities and uniqueness while allowing the researcher to explicitly model measurement error.

Secondly, the current study sought to investigate the outcomes associated with the identified family subgroups. Family profiling enables an understanding of the characteristics of the target population but further testing of antecedents and outcomes brings invaluable insight for etiological purposes, as youth offending may be a function of patterns of relevant familial factors. The outcomes in this study encompassed age at first arrest, age at first charged offense, and recidivism.

Data and Method

Participants

The sample included a total of 3,744 youth who were charged and given court orders between January 2004 and December 2008. The sample represented 97 percent (3,264 of the 3,370) of the youth offenders on community supervision and 99 percent (480 of the 485) in youth correctional institutions during this period; the remaining could not be coded as a result of missing information or file retrieval difficulties. The participants were aged between 12 and 19 years ($M = 15.30$, $SD = 1.21$, $Mdn = 15$). Majority of the offenders were males ($n = 3,327$, 89 percent) and were of Chinese
ethnicity ($n = 1,937$, 52 percent). In addition, two-thirds ($n = 2,453$, 66 percent) of the sample committed nonviolent nonsexual offenses (e.g., theft, burglary, and substance use offenses), followed by violent but nonsexual offenses such as causing hurt and robbery ($n = 1,203$, 32 percent). A small group of the sample ($n = 87$, 2 percent) committed sexual related offenses (e.g., rape, molestation, and voyeuristic offenses).

**Measures**

**Family factors.** Eight factors were used to examine family characteristics. *Father criminality, mother criminality, and sibling criminality* were coded from case file information as to whether or not the family member had previously committed a charged crime. *Nonintact family* was defined as being from a family with separated divorced parents who had not remarried. *Marital conflict, psychiatric/emotional distress, drug/alcohol abuse,* and *poor parenting* were coded under part III of the Youth Level of Service/Case Management Inventory tool 2.0 (YLS/CMI 2.0; Hoge and Andrews 2011): assessment of other needs and considerations. Marital conflict referred to the youth’s parents currently experiencing or have recently (past year) experienced marital conflict. Psychiatric/emotional distress referred to one or both of the youth’s parents who have a current psychiatric disability or a recent history (past year) of such problems. Drug/alcohol abuse referred to one or both of the youth’s parents who have current substance abuse problems or a recent history (past year) of such problems. For the above variables, a score of 1 indicated the presence of the risk factor, whereas a score of 0 indicated the absence of the risk factor. Table 1 shows the descriptives of these categorical familial variables. Poor parenting, however, was comprised of a summed score of six items measuring

| Familial Characteristics                        | Yes (Percent) | No (Percent) |
|-------------------------------------------------|---------------|--------------|
| Father criminality                              | 340 (9)       | 3,404 (91)   |
| Mother criminality                              | 118 (3)       | 3,626 (97)   |
| Sibling criminality                             | 469 (13)      | 3,275 (87)   |
| Nonintact family structure                      | 1,048 (28)    | 2,696 (72)   |
| Marital conflict                                | 289 (8)       | 3,455 (92)   |
| Parents’ psychiatric/emotional distress         | 71 (2)        | 3,673 (98)   |
| Parents’ drug/alcohol abuse                     | 84 (2)        | 3,660 (98)   |

*Note: $N = 3,744$.*

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*Note: $N = 3,744$.*
inadequate supervision, the difficulty of parent to control behavior, inappropriate discipline, inconsistent parenting, and hostile and distant parent–child relations \((M = 2.27, SD = 1.24)\). A higher score on this variable was indicative of poorer, not better, parenting for the youth.

**Outcomes.** Information on *age at first arrest* and *age at first charged offense* of the participants was coded from case file records. *Time to recidivism* was computed as the number of days from the date of the initial course order to the date of recidivism. Any youth offender without a record on recidivism by the end of the data extraction period (April 20, 2011) was coded as a “null” case, and the time variable was the number of days between the date of the initial court order and the end of the data extraction period.

**Procedure**

The current research study was retrospective in design with the approval obtained from the Ministry of Social and Family Development of Singapore. Between January 2011 and September 2012, two psychologists, one probation officer, and five research assistants were involved in reviewing the case files of youth offenders and coding the YLS/CMI 2.0 as well as background information. These raters were trained through a three-day program conducted by accredited trainers and had undergone scoring practices as well as a test in the YLS measure. Multiple sources of information were utilized: (a) psychological reports prepared by psychologists at the Clinical and Forensic Psychology Branch, (b) presentence reports prepared by probation officers, (c) charge sheets, (d) statement of facts, (e) any previous assessment and treatment reports, and (f) school reports. The coding was completed based on file information available at the time of the initial assessment at the presentencing stage; information available subsequent to the presentencing stage was not considered for coding purposes to minimize criterion contamination. After the completion of the above-mentioned coding, official recidivism data were obtained at the end of the follow-up period set at April 20, 2011. The mean follow-up period was 1,761 days \((SD = 521, \text{range} = 840–2,666)\). As the study was originally designed to examine the predictive validity of the YLS/CMI 2.0 ratings in Singapore context, more detailed description of the study procedures can be found elsewhere (Chu et al. 2014; Chu, Lee, et al. 2015).
Analytical Strategy

Statistical analyses were carried out in several sequential steps. First, latent class analysis (LCA) was conducted with Mplus 7.11 software to identify distinct family classes in the data. LCA is a statistical procedure that assigns subjects to their most likely subgroups on the basis of observed data (McLachlan and Peel 2000). The best fitting model was identified through the use of several criteria: the Akaike’s information criterion (AIC), the Bayesian information criterion (BIC), the sample-size adjusted BIC (SBIC), and the Lo, Mendell, Rubin test (LMRT). Simulation studies indicate that BIC is a typically superior indicator when compared to other information criterion statistics (Yang 2006); however, it is a common practice to use a variety of indicators in the identification of the number of classes in LCA (Nylund, Asparouhov, and Muthen 2007). In terms of interpretation of these indicators, lower AIC, BIC, and SBIC values reflect a better fit. Additionally, it is important to consider the parsimony, conceptual meaningfulness, and interpretability of various class solutions. There has to be a degree of congruence between the number of classes in the best fit model and the extant substantive theory (Nylund et al. 2007).

Having identified a latent class solution, subjects were subsequently assigned to classes based on the probability of membership as indicated by the model. A Cox regression was also performed to test the association between family class membership and recidivism. Multivariate analyses were then conducted with SPSS 19 software using class membership as a predictor of youth offending outcomes of age at first arrest and age at first charged offense. Participants whose first arrests predated the start of current order by more than a year were removed from these analyses, as familial factors were captured in extant of one year prior to the current charge. This ensured that the familial factors captured were indicative of family processes that were occurring/had occurred when the young person was arrested. A total of 2,962 (79 percent) participants were used for this analysis.

Results

Identification of Three Latent Classes

A series of one- to five-class models was tested with LCA. The local independence assumption was met, as an evaluation of bivariate residuals revealed zero significant residuals. The fit indices are shown in Table 2. The AIC revealed an improvement for each additional class. However, as seen
in Figure 1, the BIC and SBIC values for the three-class solution were lower than the two- and four-class solution. The flattening of the BIC and SBIC after the three-class solution indicated that an inclusion of additional classes might not be parsimonious. The LMRT revealed that the three-class solution was significantly better than the two-class solution, although the four-class solution was also shown to be significantly better. The five-class solution was shown to not be significantly better than a four-class solution. The entropy values for the three- and four-class solutions were found to be at 0.59 and 0.61, respectively, hence the difference of entropy was small between the two solutions.

Table 2. Fit Indices and Entropy for One- to Five-class Solutions.

| Class Solution | AIC     | BIC     | SABIC   | LMRT    | Entropy |
|----------------|---------|---------|---------|---------|---------|
| 1 Class        | 26,394.95 | 26,451.01 | 26,422.41 | —       | —       |
| 2 Classes      | 25,626.18 | 25,738.28 | 25,681.09 | 2 vs. 1: \( p < .01 \) | 0.55    |
| 3 Classes      | 25,521.10 | 25,689.26 | 25,603.47 | 3 vs. 2: \( p < .01 \) | 0.59    |
| 4 Classes      | 25,495.59 | 25,719.79 | 25,605.40 | 4 vs. 3: \( p < .01 \) | 0.61    |
| 5 Classes      | 25,482.19 | 25,762.44 | 25,619.45 | 5 vs. 4: \( p > .05 \) | 0.67    |

Note: AIC = Akaike information criterion; BIC = Bayesian information criterion; SABIC = sample-size-adjusted BIC; LMRT = Lo, Mendell, Rubin test (2 vs. 1: 2 classes vs. 1 class).

Figure 1. Trends in Bayesian information criterion (BIC) and sample-size adjusted BIC (SBIC) across latent classes.
As both the three- and four-class solutions were statistically viable, the parsimony and conceptual meaningfulness of the classes were then considered. The three-class solution was found to be more optimal in the identification of substantively coherent and distinguishable family classes.

The conceptual clarity of the three classes was then examined by plotting the prevalence estimates for the family factors across each of the latent class. The conditional item probabilities plots are presented in Figure 2 for all dichotomous family variables. The item probabilities indicated the probability that a member of a given class would endorse the specific item. Mean scores of poor parenting were calculated for the three classes, and these classes were labeled based on their familial characteristics and as seen in Figure 2: families with criminality ($M = 2.70$), poorly managed families ($M = 3.06$), and intact functioning families ($M = 1.90$). The families with criminality class was characterized by high levels of family criminality (father = 55 percent, mother = 31 percent, and sibling = 26 percent), being from a nonintact family (64 percent), marital conflict (13.7 percent), and drug/alcohol abuse (27 percent). The poorly managed families class was characterized by higher levels of poor parenting ($M = 3.06$), being from a nonintact family (60 percent), and/or the presence of marital conflict (23 percent). The intact functioning families class was characterized by minimal family criminality (father = 2.5 percent, mother = 0.2 percent, and

**Figure 2.** Prevalence of seven family factors across the three classes.
sibling = 9.4 percent), lower probability of being from a nonintact family (11 percent), and lower levels of poor parenting ($M = 1.90$).

Having identified the three family classes, the subject cases were subsequently assigned to their classes based on the probability of membership as indicated by the model. The cases which fell into the intact functioning families made up 74 percent of the sample ($n = 2744$). Families with criminality class was at 6 percent of the sample ($n = 237$), and the poorly managed families consisted of 20 percent ($n = 763$).

**Family Class Membership and Youth Offending Outcomes**

Multivariate analyses were performed with age at first arrest and age at first charged offense, as outcome variables with gender, race, and family class membership entered as predictors. The race variable was only comprised of two categories: that being of a Chinese ethnicity versus others. Interactions between gender, race, and class membership were also tested, but these were not shown to be significant.

Gender was found to be a significant factor for age at first arrest, $F(1, 2,948) = 66.67$, $p < .01$, and age at first charged offense, $F(1, 2,948) = 78.36$, $p < .01$. Females were found to be younger in age at first arrest ($M = 14.30$, $SD = 1.02$) and at first charge ($M = 14.48$, $SD = 0.96$) as compared to males at first arrest ($M = 15.05$, $SD = 1.30$) and at first charge ($M = 15.25$, $SD = 1.23$). Race was found to be a nonsignificant factor with respect to age at first arrest, $F(1, 2,948) = 0.46$, $p > .05$, and age at first charged offense, $F(1, 2,948) = 0.07$, $p > .05$.

Family class membership was a significant factor for age at first arrest, $F(2, 2,948) = 10.62$, $p < .01$, and age at first charged offense, $F(2, 2,948) = 10.80$, $p < .01$. Table 3 shows the mean ages at first arrest and first charged

### Table 3. Mean Ages at First Arrest and at First Charged Offense for Each Family Class.

| Family Classes          | Age at first arrest | Age at first charged offense |
|-------------------------|---------------------|-----------------------------|
|                         | $M$     | $SD$  | $M$  | $SD$  |
| Families with criminality | 14.59   | 1.35  | 14.76| 1.33  |
| Poorly managed families  | 14.66   | 1.36  | 14.90| 1.29  |
| Intact functioning families | 15.06  | 1.26  | 15.25| 1.19  |

Note: $n = 2,962$. 

$sibling = 9.4$ percent, lower probability of being from a nonintact family (11 percent), and lower levels of poor parenting ($M = 1.90$).
offense for each class. Post hoc pairwise comparisons with Bonferroni corrections revealed that for both age at first arrest and age at first charged offense, the mean differences between the intact functioning families class and the other two family classes were significant. However, the mean differences between families with criminality class and the poorly managed families class were not significant.

Additionally, a Cox regression was conducted with time to recidivism as the outcome variable, with family class membership, gender, and race being entered into the model as independent variables. The results revealed that males had higher rates of recidivism (hazard ratio [HR] = 1.62, \( p < .01 \), 95 percent CI = 1.35–1.95) than females. The Chinese had lower rates of recidivism (HR = 0.74, \( p < .01 \), 95 percent CI = 0.67–0.82) as compared to other races.

Family class membership had a significant effect for recidivistic outcomes after adjusting for differences in follow-up period. The intact functioning families class was less likely to recidivate as compared to the families with criminality class (HR = 0.59, \( p < .01 \), 95 percent CI = 0.49–0.72) and the poorly managed families class (HR = 0.57, \( p < .01 \), 95 percent CI = 0.51–0.64) even after differences in follow-up period were accounted for. However, the poorly managed families class showed no significant difference for recidivistic outcomes as compared to the families with criminality class (HR = 1.04, \( p > .05 \), 95 percent CI = 0.85–1.27). The survival curves are displayed in Figure 3. The hazard of recidivism for the intact functioning families class was significantly lower than the poorly managed families and families with criminality classes.

**Discussion**

The present study revealed three subgroups of familial factors in the local youth offending population. In particular, these three subgroups were classified as intact functioning families, families with criminality, and poorly managed families.

**Intact functioning families.** Members of the first class, the intact functioning families, had minimal parental and sibling criminality, no parental drug/alcohol abuse problems, no psychiatric/emotional distress, and no marital conflict. Moreover, most were from intact families. Majority of the sample fell into this category, which suggested that most youth offenders in this sample had nonserious family problems and offending could be a correlate or outcome of other factors such as antisocial or delinquent peers, poor
academic achievement or behavioral, and personality traits which support delinquency. Not surprisingly, this group had the lowest rate of recidivism and later onset of offending behavior.

Families with criminality. Six percent of the sample made up the subgroup of families with criminality. As expected, this small group of offenders had all kinds of risk factors such that their parents or siblings had past records in the criminal justice system, had drug or alcohol abuse problems, and their families were more likely to be nonintact. This group calls for serious attention, as antisocial behaviors have been shown to recur in the same families over the course of multiple generations (Dong and Krohn 2015; Farrington 2011), although the estimates of the strength of relationships between parents’ and children’s delinquency were not particularly large in magnitude. Despite the existence of a substantial degree of intergenerational discontinuity of delinquency (Dong and Krohn 2015), it is well established in literature that children of parents with criminal past are at increased risk of offending, possibly due to the transmission of antisocial values and behaviors of their families, and their exposure to various other

Figure 3. Survival curves for family class and time to recidivism.
risk factors, such as low family income and disadvantaged neighborhoods, associated with having criminal parents.

This families with criminality group evidenced the youngest age on average for both first arrest and first charged as compared to the other two family groups and had a quicker rate of recidivism as compared to the intact functioning group. This implied that youths from this group were at an increased risk of early offending and recidivism. Past studies have shown that offspring of criminals was at increased risk of criminal activities (Farrington, Coid, and Murray 2009), but the current study was unable to discern the underlying causal mechanisms in which criminality was transmitted within the family and its interaction with other familial factors in influencing the offending activities of the offspring. Future research is necessary to understand the transmission processes in this youth offending population, which includes looking more closely at the parameters of the parental criminal careers such as the frequency (Van de Rakt et al. 2010), seriousness (Nijhof, De Kemp, and Engels 2009), and timing (Van de Weijer et al. 2014) and their impact on offspring offending. Van de Rakt and colleagues (2010) found that the child’s chance of conviction increased substantially in the year after his or her father was convicted but decayed in subsequent years.

**Poorly managed families.** Interestingly, the poorly managed families had no significant difference in age at first arrest, age at first charged offense, and recidivism outcomes when compared to families with criminality. This group evidenced the highest familial disruption but low family criminality. Additionally, the youths received the poorest parenting among the three groups, with inadequate parental supervision, inconsistent discipline, and poor parent–child relationships. This finding highlighted the significance of parenting for youth offending behaviors. It is well documented in the literature that parenting factors of poor supervision, inconsistent discipline, and low involvement are contributing factors to delinquent behaviors (Farrington 2015). In the long run, familial effects have also been found to be significant such that offending in young adulthood could be predicted by the presence of activities within the family during adolescence (Hoeve et al. 2007). Familial disruption such as divorce was also a significant characteristic of poorly managed families, therefore confirming the positive association found in the wider literature between nonintact families and delinquent behaviors (Vanassche et al. 2014), a finding that has been proven consistent even in longitudinal studies (Farrington 2015).
These findings validate past research which has established that familial factors such as parenting, family criminality, and nonintact family structure are significant to youth offending outcomes (see Farrington 2015). This study complements the current western literature by using a vastly different population from a low-crime Asian context. The results indicate that dealing with family issues is essential to reduce juvenile delinquency across difficult cultures, regardless of the varied rate of crimes. Family is a crucial surround that can facilitate or undermine children’s tendencies toward active engagement, adjustment, and psychological growth. Family relationships constitute the most long-standing relationships that the child will have, and its stability contributes to the cultivation of healthy attachments and sense of security (Waters, Merrick, et al. 2000; Waters, Weinfield, and Hamilton 2000). These findings have several implications.

**Implications.** These findings point to the importance of the strengthening of the family system as part of rehabilitative efforts for youth offenders. Parenting surfaces as a significant factor, hence interventions have to enhance parental knowledge and skills. Upstream preventive efforts should be made for higher-quality parental education, which in turn can facilitate more effective parenting that facilitates prosocial adjustment and healthy functioning at an early age. Additionally, good parenting practices such as consistent discipline and close parent-child relationships have been found to function as protective factors for those most at risk—those whose parents had a criminal past (Dong and Krohn 2015). Hence, the early identification and engagement of relevant clients with familial criminality who are placed in parenting or family interventions are significant. Interventions should also be tailored for the nonintact family structure to help parents and children cope with the challenges of separation, to improve parent-child relationships, to support adjustment, and to reduce interpersonal conflict (see Keating et al. 2016). The quality of parenting after divorce matters significantly to the child’s adjustment (Amato and Gilbreth 1999; Videon 2002). Lastly, parental addictions such as drug and/or alcohol abuse have to be addressed in interventions, as these addictions can directly harm children. In addition, the children may be socialized into adopting these behaviors for themselves or that these parental drug and alcohol addiction may indirectly affect children through consequent poor parenting such as inadequate supervision and monitoring.
Limitations. The data used in this study were cross sectional in nature, thus preventing not only an assessment of the temporal sequencing of relationships between the variables but also a temporal look at the unfolding of identified subgroups over time. Familial factors may sequentially affect one another, such as the presence of parental criminality could contribute to a higher likelihood of parental separation and divorce due to higher interparental conflict stemming from antisocial values and behaviors, which may in turn affect the way they parent. Longitudinal data are thus necessary to establish causation, stability, and change in familial factors. Additionally, the current study did not differentiate between early, mid, and late adolescence for analysis. The effects of developmental stages on family circumstances and change should be clarified in future research, as the impact of family on outcomes may differ as a function of their age and developmental stage. For example, Pagani et al. (1998) found that boys who experienced remarriage between ages 12 and 15 are at greater risk for delinquency and self-reported violence and perceived less expressive parent–child relationships as compared to boys whose parents remarried between ages 6 and 11. Lastly, future studies should test other methods such as the multiple pseudo-class draws approach (Lanza, Tan, and Bray 2013), as compared to the classify-analyze method used in the current study, to account for uncertainty related to class membership. Future work can also include in other theoretically important covariates for youth offending such as individual temperament and peer delinquency to test the robustness of familial effects found in the current study.

In conclusion, the current study contributes toward new knowledge in understanding the family profiles that exist within the youth offending population in Singapore. Further research is necessary to tease out the interactive sequential effects of these variables and to test the stability and continuity of the family subgroups over time. However, the present findings provide support for targeted rehabilitative interventions tailored to strengthen the family system in order to mitigate the risk of young offenders developing into adult criminals with pathological careers.

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Note

1. Under Section 50 of the Children and Young Persons’ Act, parents and legal guardians can apply to the Youth Court for a beyond parental control order to be made against their uncontrollable child who is below the age of 16. Regarded as a last resort, families are encouraged to seek other community-based measures before taking this step. The Youth Court may order the individual to be placed on supervision for up to three years or be sent to reside in a secure residential setting for a period not exceeding three years.

References

Agnew, Robert, Timothy Brezina, John Paul Wright, and Francis T. Cullen. 2002. “Strain, Personality Traits, and Delinquency: Extending General Strain Theory.” *Criminology* 40:43-72.

Altonji, Joseph G., Sarah Cattan, and Iain Ware. 2013. “Identifying Sibling Influence on Teenage Substance Use.” Institute for Fiscal Studies Working Papers, No. W13/04, Leibniz Information Centre for Economics, London, UK. Retrieved October 7, 2015 (http://dx.doi.org/10.1920/wp/ifs/2013.1304).

Amato, Paul R. and Joan G. Gilbreth. 1999. “Nonresident Fathers and Children’s Well-being: A Meta-analysis.” *Journal of Marriage and the Family* 61:557-73.

Amato, Paul R., Laura Spencer Loomis, and Alan Booth. 1995. “Parental Divorce, Marital Conflict and Offspring Well-being during Early Adulthood.” *Social Forces* 73:895-915.

Ang, Rebecca P. and Vivien S. Huan. 2008. “Predictors of Recidivism for Adolescent Offenders in a Singapore Sample.” *Criminal Justice and Behavior* 35:895-905.

Armstrong, Derrick. 2004. “A Risky Business? Research, Policy, Governmentality and Youth Offending.” *Youth Justice* 4:100-16.

Besemer, Sytske, David P. Farrington, and Catrien C. J. H. Bijleveld. 2013. “Official Bias in Intergenerational Transmission of Criminal Behavior.” *The British Journal of Criminology* 53:438-55.

Biglan, Anthony and Keith Smolkowski. 2002. “Intervention Effects on Adolescent Drug Use and Critical Influences on the Development of Problem Behavior.” Pp. 158-83 in *Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis*, edited by D. B. Kandel. New York: Cambridge University Press.

Bijleveld, Catrien C. J. H. and Miriam Wijkman. 2009. “Intergenerational Continuity in Convictions: A Five-generation Study.” *Criminal Behaviour and Mental Health* 19:142-55.

Cheung, Chau-Kiu, Ngan-Pun Ngai, and Steven Sek-Yum Ngai. 2007. “Family Strain and Adolescent Delinquency in Two Chinese Cities, Guangzhou and Hong Kong.” *Journal of Child and Family Studies* 16:626-41.
Chu, Chi Meng, Michael Daffern, Stuart Thomas, Yaming Ang, Mavis Long, and Kate O’Brien. 2015. “Determinants of Gang Affiliation in Singaporean Youth Offenders: Social and Familial Factors.” Journal of Aggression, Conflict and Peace Research 7:19-32.

Chu, Chi Meng, Yirong Lee, Gerald Zeng, Grace Yim, Chen Yeh Tan, Yaming Ang, Shannon Chin, and Kala Ruby. 2015. “Assessing Youth Offenders in a Non-western Context: The Predictive Validity of the YLS/CMI Ratings.” Psychological Assessment 27:1013-21.

Chu, Chi Meng, Hui Yu, Yirong Lee, and Gerald Zeng. 2014. “The Utility of YLS/CMI-SV for Assessing Youth Offenders in Singapore.” Criminal Justice and Behavior 41:1437-57.

Cottle, Cindy C., Ria J. Lee, and Kirk Heilbrun. 2001. “The Prediction of Criminal Recidivism in Juveniles a Meta-analysis.” Criminal Justice and Behavior 28: 367-94.

Coughlin, Chris and Samuel Vuchinich. 1996. “Family Experience in Preadolescence and the Development of Male Delinquency.” Journal of Marriage and the Family 58:491-501.

Department of Statistics Singapore. 2015. Population Trends 2015. Singapore: Department of Statistics, Ministry of Trade & Industry, Republic of Singapore.

Dong, Beidi and Marvin D. Krohn. 2015. “Exploring Intergenerational Discontinuity in Problem Behavior: Bad Parents with Good Children.” Youth Violence and Juvenile Justice 13:99-122.

Farrington, David P. 2002. “Families and Crime.” Pp. 129-48 in Crime: Public Policies for Crime Control, edited by J. Q. Wilson and J. Petersilia. Oakland, CA: ICS Press.

Farrington, David P. 2011. “Families and Crime.” Pp. 130-57 in Crime and Public Policy, edited by J. W. Wilson and J. Petersilia. New York: Springer.

Farrington, David P. 2015. “The Developmental Evidence Base: Psychosocial Research.” Pp. 191-81 in Forensic Psychology, edited by D. A. Crighton and G. J. Towl. Singapore: John Wiley.

Farrington, David P., Geoffrey C. Barnes, and Sandra Lambert. 1996. “The Concentration of Offending in Families.” Legal and Criminological Psychology 1: 47-63.

Farrington, David P., Jeremy W. Coid, and Joseph Murray. 2009. “Family Factors in the Intergenerational Transmission of Offending.” Criminal Behaviour and Mental Health 19:109-24.

Farrington, David P., Darrick Jolliffe, Rolf Loeber, Magda Stouthamer-Loeber, and Larry M. Kalb. 2001. “The Concentration of Offenders in Families, and Family Criminality in the Prediction of Boys’ Delinquency.” Journal of Adolescence 24: 579-96.
Harrendorf, Stefan, Markku Heiskanen, and Steven Malby, eds. 2010. *International Statistics on Crime and Justice*. Helsinki, Finland: European Institute for Crime Prevention and Control.

Hoeve, Machteld, Wilma Smeenk, Rolf Loeber, Magda Stouthamer-Loeber, Peter H. van der Laan, Jan R. M. Gerris, and Judith Semon Dubas. 2007. “Long-term Effects of Parenting and Family Characteristics on Delinquency of Male Young Adults.” *European Journal of Criminology* 4:161-94.

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

Keating, Adele, John Sharry, Michelle Murphy, Brendan Rooney, and Alan Carr. 2016. “An Evaluation of the Parents Plus—Parenting When Separated Programme.” *Clinical Child Psychology and Psychiatry* 21:240-254. doi: 10.1177/1359104515581717.

Kee, C., K. Sim, J. Teoh, C. S. Tian, and K. H. Ng. 2003. “Individual and Familial Characteristics of Youths Involved in Street Corner Gangs in Singapore.” *Journal of Adolescence* 26:401-12.

Kurtz, Linda. 1994. “Psycho-social Coping Resources in Elementary School Age Children of Divorce.” *American Journal of Orthopsychiatry* 64:555-63.

Lai, Violet, Gerald Zeng, and Chi Meng Chu. 2015. “Violent and Nonviolent Youth Offenders: Preliminary Evidence on Group Subtypes.” *Youth Violence and Juvenile Justice*, 1-17. doi: 10.1177/1541204015615193.

Lansford, Jennifer E. 2009. “Parental Divorce and Children’s Adjustment.” *Perspective on Psychological Science* 4:140-52.

Lanza, Stephanie T., Xianming Tan, and Bethany C. Bray. 2013. “Latent Class Analysis with Distal Outcomes: A Flexible Model-based Approach.” *Structural Equation Modeling* 20:1-26.

Liu, Jianghong. 2011. “Early Health Risk Factors for Violence: Conceptualization, Review of the Evidence, and Implications.” *Aggression and Violent Behavior* 16:63-73.

Magnusson, David. 1995. “Individual Development: A Holistic, Integrated Model.” Pp. 19-60 in *Examining Lives in Context: Perspectives on the Ecology of Human Development*, edited by P. Moen, G. H. Elder, Jr., and K. Luscher. Washington, DC: American Psychological Association.

Magnusson, David. 1998. “The Logic and Implications of a Person-oriented Approach.” Pp. 33-63 in *Methods and Models for Studying the Individual*, edited by R. B. Cairns, L. R. Bergman, and J. Kagan. Thousand Oaks, CA: Sage.

McLachlan, Geoffrey and David Peel. 2000. *Finite Mixture Models*. New York: John Wiley.
Menard, Jessica, Bojana Knezevic, Scott R. Miller, Daniel Edelstein, Kristi Thompson, and Carlin J. Miller. 2015. “Intergenerational Transmission of Antisocial Behavior and Age at Primiparity.” *Journal of Child and Family Studies* 24: 798-808.

Miller, Todd Q. and Robert J. Volk. 2002. “Family Relationships and Adolescent Cigarette Smoking: Results from a National Longitudinal Survey.” *Journal of Drug Issues* 3:945-72.

Murray, Joseph and David P. Farrington. 2005. “Parental Imprisonment: Effects on Boys’ Antisocial Behaviour and Delinquency Through the Life-course.” *Journal of Child Psychology and Psychiatry* 46:1269-78.

Murray, Joseph and David P. Farrington. 2008a. “The Effects of Parental Imprisonment on Children.” Pp. 133-206 in *Crime and Justice*, vol. 37, edited by M. Tonry. Chicago, IL: University of Chicago Press.

Murray, Joseph and David P. Farrington. 2008b. “Parental Imprisonment: Long-lasting Effects on Boys’ Internalizing Problems through the Life-course.” *Development and Psychopathology* 20:273-90.

Nijhof, Karin S., Raymond A. T. De Kemp, and Rutger C. M. E. Engels. 2009. “Frequency and seriousness of parental offending and their impact on juvenile offending.” *Journal of Adolescence* 32:893-908.

Nylund, Karen L., Tihomir Asparouhov, and Bengt O. Muthen. 2007. “Deciding on the Number of Classes and Latent Class Analysis and Growth Mixture Modeling: A Monte Carlo Simulation Study.” * Structural Equation Modeling* 14:535-69.

Pagani, Linda, Richard E. Tremblay, Frank Vitaro, Margaret Kerr, and Pierre McDuff. 1998. “The Impact of Family Transition on the Development of Delinquency in Adolescent Boys: A 9-year Longitudinal Study.” *Journal of Child Psychology and Psychiatry* 39:489-99.

Rowe, David C. and David P. Farrington. 1997. “The Familial Transmission of Criminal Convictions.” *Criminology* 35:177-201.

Singapore Ministry of Social and Family Development. 2015. “Families and Households in Singapore, 2000-2014.” Statistical Series Paper No. 2/2015, Singapore.

Singapore Police Force. 2014. *Safeguarding Every Day. Singapore Police Force Annual 2014*. Singapore Police Force. Retrieved January 28, 2016 (http://www.police.gov.sg/prints/annual/2014/#p=101).

Thornberry, Terence P., Adrienne Freeman-Gallant, Alan J. Lizotte, Marvin D. Krohn, and Carolyn A. Smith. 2003. “Linked Lives: The Intergenerational Transmission of Antisocial Behavior.” *Journal of Abnormal Child Psychology* 31:171-84.

Vakalahi, Halaevalu F. 2001. “Adolescent Substance Use and Family-based Risk and Protective Factors: A Literature Review.” *Journal of Drug Education* 31: 29-46.
Vanassche, Sofie, An Katrien Sodermans, Koen Matthjis, and Gray Swicegood. 2014. “The Effects of Family Type, Family Relationships and Parental Role Models on Delinquency and Alcohol Use among Flemish Adolescents.” *Journal of Child and Family Studies* 23:128-43.

Van de Rakt, Marieke, Paul Nieuwbeerta, and Robert Apel. 2009. “Association of Criminal Convictions between Family Members: Effects of Siblings, Fathers and Mothers.” *Criminal Behavior and Mental Health* 19:94-108.

Van de Rakt, Marieke, Paul Nieuwbeerta, and Nan Dirk De Graaf. 2008. “Like Father, Like Son? The Relationships between Conviction Trajectories of Fathers and Their Sons and Daughters.” *British Journal of Criminology* 48:538-56.

Van de Rakt, Marieke, Stijn Ruiter, Nan Dirk De Graaf, and Paul Nieuwbeerta. 2010. “When Does the Apple Fall from the Tree? Static versus Dynamic Theories Predicting Intergenerational Transmission of Convictions.” *Journal of Quantitative Criminology* 26:371-89.

Van de Weijer, Steve G. A., Catrrien C. J. H. Bijleveld, and Arjan A. J. Blokland. 2014. “The Intergenerational Transmission of Violent Offending.” *Journal of Family Violence* 29:109-18.

Videon, Tami M. 2002. “The Effects of Parent-adolescent Relationships and Parental Separation on Adolescent Well-being.” *Journal of Marriage and the Family* 64:489-503.

Waters, Everett, Susan Merrick, Dominique Treboux, Judith Crowell, and Leah Albersheim. 2000. “Attachment Security in Infancy and Early Adulthood: A Twenty-year Longitudinal Study.” *Child Development* 71:684-89.

Waters, Everett, Nancy S. Weinfield, and Claire E. Hamilton. 2000. “The Stability of Attachment Security from Infancy to Adolescence and Early Adulthood: General Discussion.” *Child Development* 71:703-6.

Yang, Chih-Chien. 2006. “Evaluating Latent Class Analyses in Qualitative Phenotype Identification.” *Computational Statistics & Data Analysis* 50:1090-104.

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