


Violence and Externalizing Behavior Among Youth in the United States: Is There a Severe 5%?

Youth Violence and Juvenile Justice
00(0) 1-19
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DOI: 10.1177/1541204013478973
yvj.sagepub.com


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Abstract

Despite research demonstrating that approximately 5% of study populations are composed of severely antisocial persons who account for a disproportionate share of problem behaviors, there have been no nationally representative studies assessing this phenomenon among adolescents. Using a large nationally representative sample ($N = 18,614$), we identified a severe group (4.7% of respondents) characterized by involvement in varied and intensive externalizing behaviors, greater internalizing, lower academic achievement, and less parental involvement. The current study is the first nationally representative study of criminal careers/externalizing behaviors among adolescents in the United States, which is convergent with prior research and theory.

Keywords

criminal career, externalizing behavior, antisocial behavior, youth

Introduction

The asymmetrical nature of offending is profound. Put simply, a majority of problem behaviors are committed by a minority of persons (DeLisi & Piquero, 2011; Thornberry, Huizinga, & Loeber, 1995; Tracy, Wolfgang, & Figlio, 1990; Walters, 2012; Wolfgang, Figlio, & Sellin, 1972). The repeated empirical finding that approximately 5% of a sample or population is composed of individuals, usually male but not exclusively, that account for a disproportionate share of offenses is critical for prevention science and policy to address. Arguably, it is the essence of the “crime problem.” A large and convergent literature has documented the “severe 5%” linked to a number of important but overlapping theoretical constructs such as life-course-persistent offender, serious, violent, and chronic delinquent, early-onset severe conduct

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disorder, and fledgling psychopath (e.g., DeLisi et al., 2011; Loeber & Farrington, 1998; Moffitt, 1993, 2003). This group is characterized by a disproportionate contribution to violence, substance abuse, property damage, mental health distress, and social and economic burden (DeLisi, 2005; Moffitt, 1993, 2003; Ribeiro da Silva, Rijo, & Salekin, 2012; Salekin & Lynam, 2010; Vaughn & DeLisi, 2008) and has been identified as arguably the most pressing and important problem in child mental health (Eme, 2010). Studies indicate that the behavioral and collateral consequences of severe antisocial behavior are enormous and widespread resulting in likely billions in justice system, victimization, mental health, and associated costs (Cohen, 1998; Cohen & Piquero, 2009; DeLisi & Gatling, 2003; DeLisi et al., 2010). The average cost of each chronically violent youth has been estimated as 2 million dollars (Dodge, 2009). For these reasons, a better understanding of the epidemiology of severe antisocial behavior is central to advancing prevention and treatment of what is a major social issue.

Despite the convergent findings that have accumulated on severe antisocial behavior, Vaughn, DeLisi et al., 2011 have noted several shortcomings to these lines of research that impede their external validity. These include geographically bound birth cohort designs (e.g., Brame, Mazerolle, & Piquero, 2010; Wolfgang et al., 1972), too few extreme offenders (DeLisi, 2001; Piquero, Farrington, & Blumstein, 2007), and overreliance on enriched correctional samples and other research participants derived from the criminal justice system (e.g., arrestees, civilly committed patients; Amirault & Lussier, 2011; Berg & DeLisi, 2005; Blackburn & Trulson, 2010; Lussier, Bouchard, & Beauregard, 2011; Pedneault, Harris, & Knight, 2012; Sorensen, Cunningham, Vigen, & Woods, 2011; Sorensen & Davis, 2011). Although invaluable, these lines of research have been unable to produce findings on extreme externalizing and antisocial behavior within a highly generalizable framework that can be universally applicable to children and adolescents.

In this article, we extend previous work by Vaughn and colleagues (2011) that identified a severe 5.3% of adults using latent class analysis (LCA) in the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC) that is convergent with prior work on serious antisocial behavior and disproportionality. This group was characterized by high levels of antisocial behavior and substance use also possessing substantial co-occurring psychopathology. Specifically, we build on this previous work by again identifying and modeling characteristics and associations of a severe 5% subgroup using a different nationally representative data source and age range (12- to 17-year-olds). We do so in order to assess the “downward extension” of the severe 5% concept based on a set of externalizing behaviors and sociodemographic factors and then executing an external validation of these latent classes by evaluating the associations with key variables such as anxiety and depression, parental involvement, academic achievement, and religiosity.

The Externalizing Spectrum

The externalizing spectrum is an important construct for youth violence. Externalizing liability is characterized by general behavioral disinhibition and what are commonly termed acting out behaviors. Externalizing behaviors include substance use, aggression and violence, theft, and property destruction. The use of substances is an integral part of the externalizing spectrum due to their co-occurrence and highly intertwined relationship to delinquency and violence (Krueger et al., 2002; Vaughn, Freedenthal, Jenson, & Howard, 2007). As Krueger and colleagues have argued (2007) externalizing converges with, helps to organize, and in many respects is an umbrella concept for constructs such as low self-control (Vaughn, Perron, Beaver, DeLisi, & Wexler, 2010), psychopathy (Vaughn & DeLisi, 2008), neurodisinhibition (Tarter et al., 2003), impulsivity (Barratt, 1994), risk seeking (Vaske, Ward, Boisvert, & Wright, 2012), and conduct disorder (Krueger,

Markon, Patrick, & Iacono, 2005). The past decade has witnessed a keen interest in the externalizing spectrum mainly for two purposes: advance the search for a common etiology to substance use disorders and antisocial behavior and develop better measures and diagnostic indicators of substance abuse and problem behaviors over the life course for the new *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition; *DSM-V*) to be released in May 2013.

With respect to etiology, several studies suggest that externalizing is an inherited vulnerability (Hicks, Krueger, Iacono, McGue, & Patrick, 2004). Several well-designed behavior genetic studies across multiple data centers and independent samples suggest that there is a uniform pattern in heritable molecular genetic processes associated with a vulnerability to externalizing. First, linkage analysis from the Collaborative Study on the Genetics of Alcoholism using a dimensional component of externalizing has indicated a candidate gene, *CHRM2* (Dick et al., 2008). More recent behavior genetic research by Stephens and colleagues (2012) revealed that a gene cluster (*CHRNA5/CHRNA3/CHRNB4*), which has been linked to nicotine and alcohol dependence in previous studies, is associated with an externalizing phenotype across three longitudinal samples including the National Longitudinal Study of Adolescent Health, the Colorado Center for the Genetics of Antisocial Drug Dependence, and the National Youth Survey–Family Study and involving over 3,000 study participants. The strongest association was found for stealing (>0.60) with smaller coefficients for fighting and weapon use. These results provide compelling evidence for a genetic liability to externalizing that is facilitated by upstream frontal lobe vulnerabilities to disinhibiting and poor behavior control (e.g., Brower & Price, 2001).

The extent to which poor behavior controls and externalizing behaviors relate to other important factors such as parenting and child care, internalizing, and academic performance have also been studied. Using data from the National Institute of Child Health and Development Study of Early Child Care and Youth Development, Belsky and Pluess (2011) found that externalizing among adolescents with negative temperaments (compared to more positive temperaments) was predicted by poor child care. Interestingly, however, high-quality care did not result in less externalizing suggesting, according to the authors, greater vulnerability but not necessarily malleability. Vaughn, Beaver, DeLisi, and Wright (2009) identified a severely impaired subgroup of children (9.8%, $n = 1,594$) from a nationally representative kindergarten cohort, who demonstrated poor self-control based on parent and teacher assessments over time. Results from a regression analysis predicting subgroup membership showed that externalizing behaviors, interpersonal skills deficits, and learning problems were important predictors of subgroup membership. Parents of these children were significantly more likely than parents of other children to report greater stress and to use physical punishment, suggesting that these parents were managing difficult temperaments. Further analyses of multiple waves of this subgroup using structural equation modeling indicated that early learning difficulties predicted interpersonal deficits, which in turn was strongly associated with poor self-control that predicted later externalizing behavior (Vaughn et al., 2010).

Although self-control can be considered basic to comprehending the externalizing spectrum and externalizing subgroups (Barkley, 2005; Fishbein, 2000; Gottfredson & Hirschi, 1990), their interrelations with other factors such as internalizing, achievement, and parenting are not fully understood. Although it is well established that children who have impulse-control problems are also at greater risk of having interpersonal skill deficits and generally poor relations with others due to a difficult temperament and peer rejection (Dodge & Sherrill, 2007; Moffitt, 1993), the complex transactional nature of the antecedents of externalizing, yet alone among severe subgroups, has not been modeled extensively (Hinshaw, 2002). Unfortunately, early and severe externalizing is associated with a range of problems over long swaths of the life course (Campbell, Shaw, & Gilliom, 2000; DeLisi, 2005; Fergusson & Horwood, 1998; Moffitt, 1993). Thus, a deeper understanding of severe or extreme externalizing is likely to be important in facilitating selected prevention and treatment interventions.

The Present Study Rationale

The social and economic costs of high-rate antisocial behavior are enormous (DeLisi et al., 2010; Eme, 2010). Characterizing extreme externalizing is important for not only better understanding the criminological study of asymmetry in offending but also its practical value of designing empirically grounded policies and practices to forestall its negative consequences at the earliest stages possible. Generalizable study samples are badly needed in this area and employing nationally representative data sources is a major advance. Although Markon and Krueger (2005) found using the NESARC that externalizing could be conceptualized as a relatively continuously distributed latent trait, Vaughn et al. (2011) also using the NESARC found that latent class models were revealing in identifying a severe externalizing latent subgroup (5.3%) that converged well with and extended long-standing research in the career criminal paradigm. However, this line of research employed a sample of persons 18 years and older and therefore precluded a downward extension of the severe 5% to youth.

The present study fills this void by employing a nationally representative sample of 12- to 17-year-olds derived from the National Survey on Drug Use and Health (NSDUH). The major study objective is thus to test whether a latent subgroup of youth can be identified and characterized using latent class modeling that corresponds to the severe 5% found in an adult sample and previous research on the asymmetry of offending. A second objective is to characterize these youth across a range of important variables such as depression, anxiety, parental involvement, school engagement, and religiosity. Many of these variables have received little attention in previous studies of externalizing and in particular the criminal careers literature. Our overarching hypothesis is that a severe subgroup (approximately 5%) will be identified that converges with prior studies. We also hypothesize that this latent subgroup will be disproportionately male, possess greater odds of having anxiety and depression, greater academic problems, less parental support, and account for a disproportionate share of externalizing behaviors compared to other identified latent subgroups.

Method

Sample and Procedures

This study is based on public-use data from the 2010 NSDUH (Substance Abuse and Mental Health Services Administration [SAMHSA], 2011). The NSDUH is designed to provide population estimates of substance use and health-related behaviors in the U.S. general population. It utilizes multistage area probability sampling methods to select a representative sample of the U.S. civilian, noninstitutionalized population 12 years or older for participation in the study. Multistage sampling designs commonly are used when attempting to provide nationally representative estimates. This is because interviewing all participants is not feasible so larger units are the first stage selected from which subsequent levels of strata are partitioned until individuals from households are selected. With respect to the NSDUH, all 50 states and the District of Columbia were employed. Study participants include household residents; residents of shelters, rooming houses, and group homes; and civilians residing on military bases. To improve the precision of drug use estimates for subgroups, adolescents 12–17 years and young adults 18–25 years were oversampled.

NSDUH study participants were interviewed in private at their places of residence. Potential participants were assured that their names would not be recorded and that their responses would be kept strictly confidential. Participants were paid \$30 for their participation. The NSDUH interview utilizes a computer-assisted interviewing (CAI) methodology to increase the likelihood of valid respondent reports of illicit drug use behaviors (SAMHSA, 2011). The CAI methodology includes a combination of computer-assisted personal interviewing (CAPI) and audio computer-assisted self-interviewing methodologies. A more detailed description of the NSDUH sampling and data collection procedures are documented in greater detail elsewhere (SAMHSA, 2011).

A total of 68,487 respondents 12 years or older completed the 2010 survey. Weighted response rates were 88.8% for household screening and 74.7% for interviewing (SAMHSA, 2011). Each independent, cross-sectional NSDUH sample was considered representative of the U.S. general population 12 years or older. The current study restricted analyses to adolescents 12–17 years ($N = 18,614$). The mean age of the sample is 14.6 ($SD = 1.7$). The respondents were evenly distributed between males (51.0%) and females (49.0%) but are unevenly distributed in terms of race/ethnicity. More than half (59.6%) of the respondents are White, 17.6% are Hispanic, and 13.4% are African American. The annual family income of 17.3% of the sample is less than \$20,000; 31.8% have income between \$20,000 and \$49,999; 18.6% have income between \$50,000 and \$74,999; and 32.3% have more than \$75,000 annual family income.

Measures

Externalizing Behavior Variables. This study identified latent externalizing classes of adolescents on the basis of 12 externalizing variables in the domains of substance use, delinquency, and violence. Five of these variables relate to the use of illicit substances, including the use of tobacco, alcohol, marijuana, inhalants, and hallucinogens in the previous 12 months. Adolescents who had used these substances were identified by responding to questions about the frequency of use of each of the aforementioned substances during the previous 12 months. Sample items include “On how many days in the past 12 months did you use marijuana or hashish?” and “On how many days in the past 12 months did you drink an alcoholic beverage?” For each item, adolescents who responded that they had not used these substances on any days were coded as 0, while youth who reported one or more instances of use were coded as 1. Although the NSDUH measures the use of a variety of illicit substances, several illicit substances were excluded from the analysis, such as cocaine and ecstasy, because their prevalence of use among adolescents was below 3% and, as such, their inclusion would likely result in instability in model building.

Seven other indicator variables are related to delinquent and violent behavior during the previous 12 months. These items include measures of truancy, theft, selling drugs, the carrying of handgun, fighting, group fighting, and violent attacks. Adolescents who had engaged in these behaviors were identified by responding to questions about the frequency of engagement in delinquent and violent behaviors during the previous 12 months. For example, adolescents who engaged in theft (3.94%) were identified based on whether they responded affirmatively to the question, “During the past 12 months, how many times have you stolen or tried to steal anything worth more than \$50?” Similarly, adolescents who engaged in a severe attack (7.23%) were identified based on whether they responded affirmatively to the question, “During the past 12 months, how many times have you attacked someone with the intent to seriously hurt them?” For each item, youth who responded that they had not taken part in each behavior were coded as 0, while youth who reported one or more instances of engagement were coded as 1.

Covariates. Finally, several key sociodemographic variables were also included as covariates to refine the validation of subgroups of truant adolescents. The following variables were used: age, gender, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and other [American Indian or Alaska Native, Asian, other Pacific Islander or Native Hawaiian, and persons reporting more than one race]), and total annual family income (less than \$20,000, \$20,000–\$49,999, \$50,000–\$74,999, and \$75,000 or more). Family income was ascertained by asking respondents, “of these income groups, which category best represents your total combined family income during the previous calendar year?” Because adolescents are often unable to provide accurate estimates about family household income, responses from an adult or other household member were provided.

Independent Variables

A variety of key covariates in the domains of psychological, parental, academic, and religiosity factors were also included for the purposes of validation of the latent class solution.

Psychological Factors. Three measures were used in the domain of psychological factors, including risk propensity, lifetime depression, and lifetime anxiety. Risk propensity was measured by summing 2 items related to the frequency of adolescent enjoyment of participation in dangerous or risky behaviors. Both items had the response format of never, seldom, or sometimes/always ($\alpha = .81$). Determination of lifetime depression and lifetime anxiety were based on whether the respondents were told by a doctor or medical professional that they had either of these disorders.

Parental Factors. Two measures were used to examine the relationship between parental factors and membership in latent externalizing classes. The measure of parental support was comprised of 3 items relating to adolescents' perceptions of their parents' supportive involvement in their positive development. Items included the measurement of the frequency with which the parents provided positive reinforcement and checked or helped with school homework. Response categories included *never* (1), *seldom* (2), *sometimes* (3), and *always* (4). This 3-item measure was found to have acceptable psychometric properties with all items loading cleanly onto a single latent factor and a somewhat low yet acceptable Cronbach's α coefficient ($\alpha = .69$). Parental control was measured by asking respondents, "during the past 12 months, how often did your parents limit the amount of time you went out with friends on school nights?" Response categories included *never* (1), *seldom* (2), *sometimes* (3), and *always* (4).

Academic Factors. Two additional measures were used to examine the relationship between school factors and class membership. The measure of school engagement was comprised of 5 items relating to respondents' feelings toward school during the previous 12-month period. These included questions such as "How you felt overall about going to school?" "How important do you think things you learned will be in future?" and "How often did a teacher let you know you were doing a good job?" These five questions each had a 4-item response format and were coded so that lower values represented lower levels of school engagement and higher values represented high levels of school engagement. This 5-item measure of school engagement was found to have acceptable validity and reliability, with all items loading onto a single latent factor and an acceptable Cronbach's α coefficient ($\alpha = .76$). Additionally, grades were measured by asking respondents, "what were your average grades for the last semester or grading period you completed?" Response categories were coded into four ordinal groups including "A" (21.19%), "B" (38.50%), "C" (29.90%), and "D or lower" (10.41%). Response categories were coded to range from 1 to 4, with higher values representing greater academic achievement and lower values representing academic difficulty.

Religiosity Factors. Two measures of religiosity were examined in this study: public and private religiosity. Public religiosity was measured by asking respondents, "during the past 12 months, how many times did you attend religious services (excluding special occasions such as weddings, funerals, etc.)?" Youth were categorized into five ordinal groups ranging from no religious service attendance ($N = 6,262$) to attendance at more than 52 religious services in the previous year ($N = 3,066$). Private religiosity was assessed by summing 2 items measuring the degree to which respondents considered religious beliefs to be important to their life and decision making ($\alpha = .87$). More precisely, these two items were measured by asking respondents the degree to which they agreed with the following statements: "Your religious beliefs are a very important part of your life" and "Your religious beliefs influence how you make decisions in your life." Both items had the response

format of “strongly disagree,” “disagree,” “agree,” and “strongly agree” with higher scores indicating greater adolescent private religiosity.

Statistical Analyses

Statistical analyses were carried out in several sequential steps. First, LCA was conducted in order to identify latent externalizing classes of adolescents in the sample. More precisely, a series of latent class models ranging from 1 to 5 classes were carried out using Latent GOLD® 4.5 software (Vermunt & Magidson, 2008) in order to identify distinct externalizing profiles of adolescents. Distributional analyses of the externalizing behavior variables showed that they were not normally distributed in the sample population with relatively high skewness (1.79) and kurtosis (6.52). As such, LCA is an ideal method for handling these categorical indicators that when summed are nonnormal. LCA is a statistical procedure that assigns subjects to their most likely subgroups on the basis of observed data (McLachlan & Peel, 2000). Several criteria were used to identify the best fitting model, including the Bayesian Information Criterion (BIC), Akaike’s Information Criterion (AIC), Consistent Akaike’s Information Criterion (CAIC), and log likelihood. Notably, simulation studies indicate that the BIC is typically a 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, latent profile analysis (LPA), and other finite mixture modeling techniques (Nylund, Asparouhov, & Muthen, 2007). In terms of interpretation of these indicators, lower AIC, CAIC, and BIC values and higher log likelihood values reflect better model fit. Additionally, parsimony as well as the conceptual meaningfulness and interpretability of various class solutions should also be considered in the identification of the final model. As noted by Nylund, Asparouhov, and Muthen (2007), in addition to the evaluation of the statistical fit indicators described above, a key criterion for the selection of the number of classes is the degree of congruence between the classes and extant substantive theory.

Having identified a latent profile solution, subjects subsequently were assigned to classes based on the probability of membership as indicated by the model. This profile solution was, in turn, validated by using multinomial regression to predict class membership based on key psychological, parental, academic, and religiosity factors. The class with the highest proportion of adolescents was selected as the reference category. Relative risk ratios and accompanying confidence intervals were estimated. Relative risk ratios refer to the ratio of the absolute risks in two particular groups, that is, the ratio of the probability of the occurrence of an event given a particular condition versus the occurrence of the event given a distinct condition (Polit, 2010). In the case of multinomial regression with latent classes, relative risk ratios refer to the likelihood of membership in one particular class versus a specified reference class and are conceptually similar to odds ratios (Zhang & Kai, 1998). Statistical procedures involving prevalence estimates and regression models were conducted using Stata 12.1SE survey data functions (StataCorp, 2011). This system implements a Taylor series linearization to adjust standard errors of estimates for complex survey sampling design effects including clustered multistage data.

Results

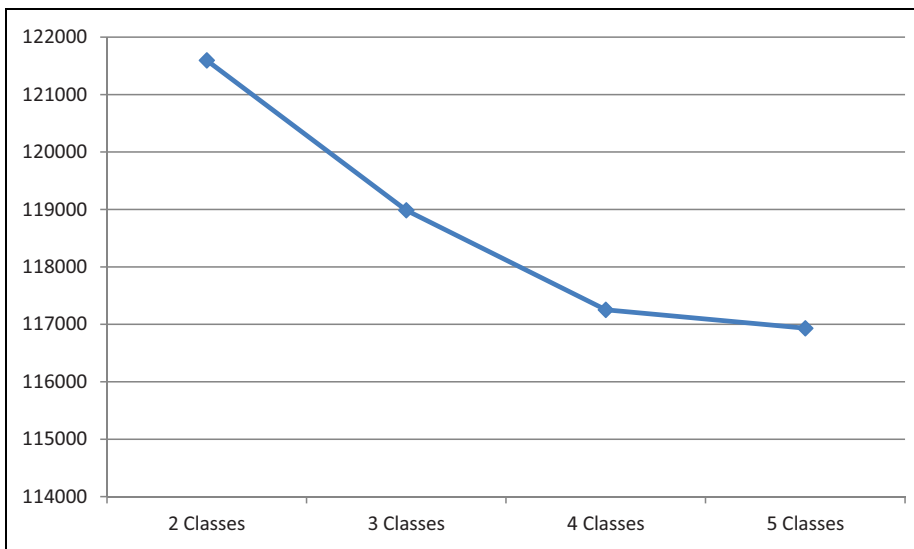
Identification of Latent Externalizing Classes

An analysis of the latent profile models indicated that the four-class solution was the statistically and substantively best fitting model. As revealed in Table 1, the AIC, CAIC, and BIC values for the five-class solution were slightly lower and the log likelihood value slightly higher than the respective values for the four-class solution. However, as seen in Figures 1 and 2, the accelerated flattening of the BIC and log likelihood values between the four- and five-class solutions indicated that the

Table 1. Fit Indices for Latent Externalizing Classes.

Class Solution	BIC	AIC	CAIC	Log Likelihood
1 Class	139,551.90	139,457.92	139,563.90	-69,716.96
2 Classes	121,596.26	121,400.47	121,621.26	-60,675.23
3 Classes	118,986.28	118,688.68	119,024.28	-59,306.34
4 Classes	117,253.25	116,853.84	117,304.25	-58,375.92
5 Classes	116,932.37	116,431.14	116,996.37	-58,151.57

Note. AIC = Akaike's Information Criterion; BIC = Bayesian Information Criterion; CAIC = Consistent Akaike's Information Criterion.

**Figure 1.** Trends in Bayesian Information Criterion values across latent externalizing classes.

inclusion of an additional fifth class would not be parsimonious. Additionally, the conceptual makeup of the four-class solution suggested that this solution effectively identified a substantively meaningful and interpretable modeling of the externalizing heterogeneity of the sample. Overall, despite the minor differences among the information criterion statistics, the accelerated flattening of the information criterion indicators between the four- and five-class solutions—as well as the conceptual clarity and interpretability of the four-class solution—suggested that the four-class solution was optimal in terms of identifying a parsimonious, statistically viable, and substantively coherent latent class solution.

The conceptual fit of the latent class model was examined by means of plotting the prevalence estimates for the 12 externalizing behaviors across each of the latent classes. As seen in Figure 3, the four-class solution is comprised of a normative class (72.59%, $N = 13,512$), a substance user class (13.33%, $N = 2,482$), a violent class (9.35%, $N = 1,740$), and a severe class (4.73%, $N = 880$). These four classes are clearly distinguishable and substantively interpretable. The normative class, which comprises nearly three quarters of the sample (72.59%), is characterized by the overall low levels of substance use, delinquency, and violence. The substance user class is characterized by the combination of extremely elevated levels of tobacco (77.49%), alcohol (91.84%), and marijuana (70.87%) use, with relatively low to moderate levels of delinquent and violent behavior.

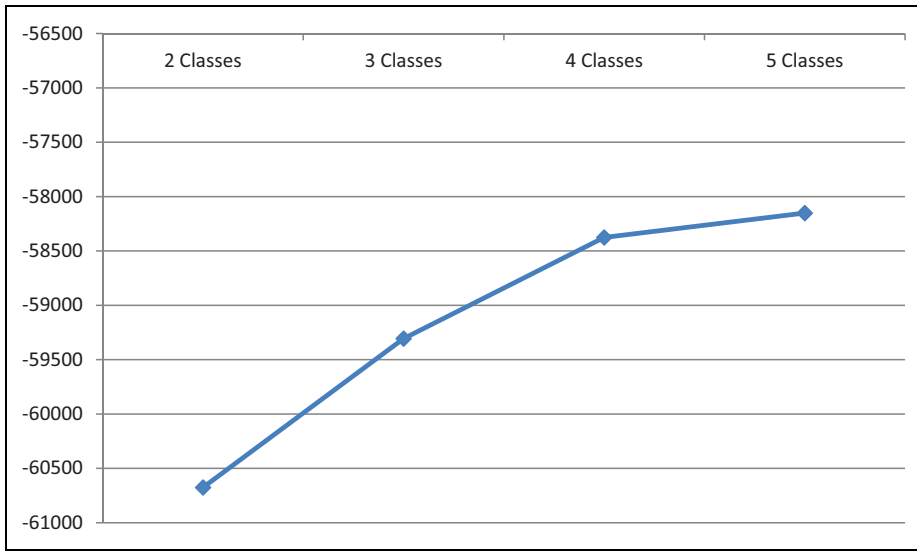


Figure 2. Trends in log likelihood values across latent externalizing classes.

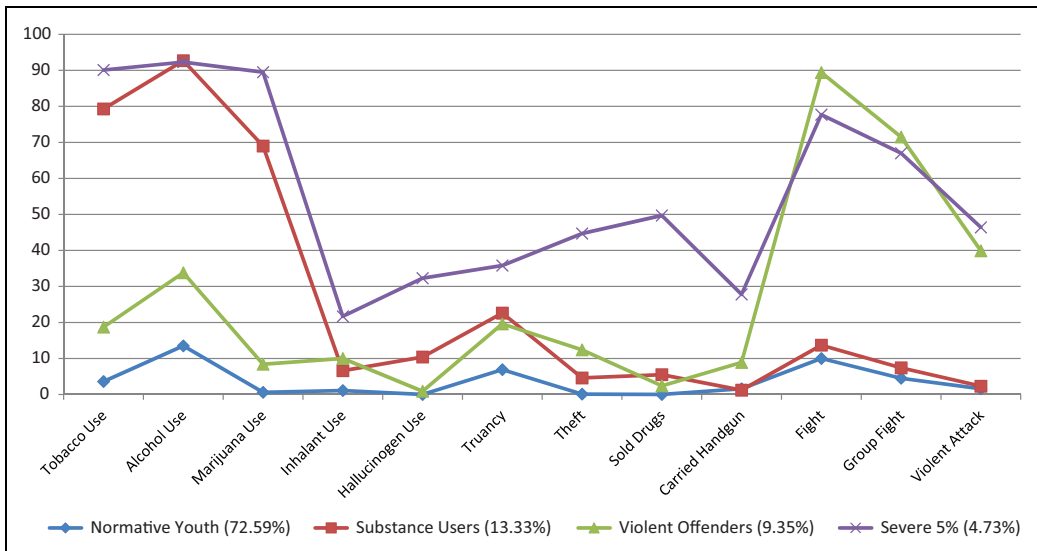


Figure 3. Last year prevalence of 12 externalizing behaviors across four latent classes.

The violent offender class is characterized by markedly elevated prevalence estimates in terms of fighting (89.43%), group fighting (70.40%), and violent attacks (40.68%) in combination with low to moderate levels of delinquency and slightly elevated levels of tobacco (19.08%), alcohol (32.72%), and marijuana use (8.05%). Finally, the severe class, which comprises approximately 5% of the total sample (4.73%), is characterized by markedly and consistently elevated levels of substance use, delinquency, and violence. In all, these four classes represent a clearly distinguishable, interpretable, parsimonious, and statistically acceptable cluster solution representative of the externalizing heterogeneity of the sample.

Sensitivity Analyses

We performed two sets of sensitivity analyses. First, we conducted an LPA in 12- to 14- and 15- to 17-year-old adolescents separately to examine developmental sensitivity. Results showed a similar pattern with a four-class model representing the best fitting solution in each age range. As expected, the proportion in the severe group was somewhat higher in the older adolescent age range. Second, we replicated our LPA solution with the 2009 NSDUH data and results indicated that a four-class solution fit the data and a severe subgroup of 3.7% was identified. Given these findings, we proceeded with a four-class solution using the entire sample.

Sociodemographic Profile of Latent Externalizing Classes

Table 2 reveals percentages and confidence intervals of sociodemographic characteristics of each latent externalizing class. The normative class is relatively evenly distributed in terms of age and gender. Notably, this class has the highest proportion of adolescents who are classified as “other” in terms of race/ethnicity and has, in comparison to the violent offender and severe classes, an elevated proportion of youth living in families with income levels above \$50,000 per year (52.44%). The substance user class stands out as the class with the highest proportion of youth aged 16–17 (65.34%), White youth (65.46%), and in comparison to the violent offender and severe classes, an elevated proportion of youth living in families with income levels above \$50,000 per year (52.52%). The violent offender class has, by far, the highest proportion of African American youth (23.70%), is disproportionately male (60.52%), and has the highest proportion of adolescents from families earning less than \$20,000 per year (23.13%). The violent offender class also has the lowest proportion of White adolescents (47.39%). Finally, the severe class has the highest proportion of male adolescents (64.90%), the highest proportion of youth from families earning less than \$50,000 per year (63.46%), and tends to be older as 91.22% of youth in this class are 14 years of age or older.

Independent Variables Associated With Class Membership

Table 3 displays results of a multinomial logistic regression analysis examining the associations between key independent variables and the identified latent classes with the normative class as the reference class. Along the lines of age, members of the violent offenders class were significantly less likely to be in the 14- to 15- (risk ratio [RR] = 0.76, confidence interval [CI] = [0.63, 0.93]) or 16- to 17-year-old (RR = 0.69, CI = [0.56, 0.85]) age brackets compared to normative youth. In contrast, members of the severe and substance user classes were significantly more likely to be older than 12–13 years, compared to the normative class. In terms of gender, compared to members of the normative class, members in the violent offenders and severe classes were 37% and 76% more likely to be male than female. As for race/ethnicity, a number of significant relationships were identified. Membership in the severe class was significantly associated with African American identity (RR = 2.01, CI = [1.39, 2.92]) such that severe youth were 101% more likely than normative youth to report identifying as African American than as White. Similarly, violent offender youth were also significantly more likely to report identifying as racially/ethnically African American (RR = 2.28, CI = [1.18, 1.97]) or Hispanic (RR = 1.27, CI = [1.02, 1.58]) than as White. Finally, with respect to family income, in both the violent offender and severe classes, members of these classes were significantly more likely to report family incomes of less than \$50,000 and less than \$20,000 compared to youth in the normative class.

In terms of key psychological, parental, academic, and religiosity covariates, a number of salient associations were identified. Membership in the substance user, violent offender, and severe classes was significantly associated with all three psychological factors examined in this study. Notably,

Table 2. Sociodemographic Characteristics of Latent Externalizing Classes.

	Class 1 (Normative Youth)		Class 2 (Substance Users)		Class 3 (Violent)		Class 4 (Severe)		χ^2 Significance
	N = 13,512 (72.59%)	95% CI	N = 2,482 (13.33%)	95% CI	N = 1,740 (9.35%)	95% CI	N = 880 (4.7%)	95% CI	
	%		%		%		%		
Age									
12–13	37.97	[36.89, 39.06]	5.17	[4.06, 6.57]	37.62	[34.63, 40.72]	8.78	[6.38, 11.95]	<.001
14–15	33.27	[32.22, 34.33]	29.49	[27.18, 31.91]	34.83	[31.89, 37.89]	35.55	[31.27, 40.09]	
16–17	28.76	[27.75, 29.79]	65.34	[62.81, 67.79]	27.55	[24.75, 30.53]	55.67	[51.01, 60.23]	
Gender									
Male	49.23	[48.11, 50.35]	51.14	[48.50, 53.78]	60.52	[57.39, 63.57]	64.98	[60.48, 69.23]	<.001
Female	50.77	[49.65, 51.89]	48.86	[46.22, 51.50]	39.48	[36.43, 42.61]	35.02	[30.77, 39.52]	
Race/ethnicity									
White	57.89	[56.76, 59.01]	65.46	[62.85, 67.98]	47.39	[44.27, 50.52]	55.91	[51.22, 60.51]	<.001
African American	14.29	[13.52, 15.10]	10.54	[8.95, 12.37]	23.70	[21.02, 26.60]	15.21	[12.30, 18.66]	
Hispanic	19.86	[18.92, 20.85]	19.11	[17.00, 21.41]	22.75	[19.99, 25.78]	23.11	[19.15, 27.61]	
Other	7.96	[7.35, 8.61]	4.89	[3.96, 6.02]	6.16	[4.84, 7.81]	5.77	[3.97, 8.30]	
Family income									
<\$20,000	16.26	[15.44, 17.11]	16.81	[14.91, 18.90]	23.13	[20.54, 25.93]	22.04	[18.35, 26.22]	<.001
\$20,000–\$49,000	31.31	[30.26, 32.37]	30.77	[28.40, 33.24]	37.87	[34.83, 41.02]	41.42	[36.90, 46.08]	
\$50,000–\$74,000	18.03	[17.19, 18.90]	17.24	[15.36, 19.30]	14.56	[12.53, 15.84]	12.57	[10.02, 15.67]	
>\$75,000	34.41	[33.37, 35.47]	35.18	[32.69, 37.75]	24.45	[21.87, 27.22]	23.97	[20.20, 28.19]	

Table 3. Characteristics of Latent Externalizing Classes.

Variables	Class 2 (Substance Users)		Class 3 (Violent Offenders)		Class 4 (Severe)	
	RR	95% CI	RR	95% CI	RR	95% CI
Sociodemographic variables						
Age						
14–15 years	4.17	[3.08, 5.66]	0.76	[0.63, 0.93]	2.61	[1.63, 4.19]
16–17 years	10.52	[7.83, 14.1]	0.69	[0.56, 0.85]	4.91	[3.08, 7.84]
Male	0.87	[0.76, 1.01]	1.37	[1.16, 1.62]	1.76	[1.37, 2.27]
Race/ethnicity						
African American	0.91	[0.71, 1.16]	2.28	[1.78, 2.91]	2.01	[1.39, 2.92]
Hispanic	0.85	[0.69, 1.05]	1.27	[1.02, 1.58]	1.09	[0.76, 1.56]
Other	0.63	[0.48, 0.82]	1.10	[0.78, 1.56]	1.00	[0.57, 1.78]
Family income						
<\$20,000	1.16	[0.92, 1.46]	1.52	[1.18, 1.97]	1.64	[1.08, 2.47]
\$20,000–\$49,000	0.95	[0.80, 1.14]	1.29	[1.03, 1.60]	1.60	[1.16, 2.20]
\$50,000–\$74,000	0.90	[0.74, 1.09]	0.86	[0.68, 1.10]	0.84	[0.58, 1.21]
Key covariates						
Psychological factors						
Risk propensity	1.53	[1.45, 1.61]	1.48	[1.39, 1.57]	2.19	[1.94, 2.48]
Lifetime depression	1.35	[1.01, 1.81]	1.69	[1.22, 2.36]	2.53	[1.73, 3.69]
Lifetime anxiety	1.72	[1.14, 2.34]	1.61	[1.07, 2.43]	2.47	[1.56, 3.91]
Parental factors						
Support	0.93	[0.90, 0.96]	0.89	[0.85, 0.92]	0.85	[0.81, 0.89]
Control	1.01	[0.95, 1.00]	0.96	[0.88, 1.03]	0.89	[0.80, 0.99]
Academic factors						
Engagement	0.98	[0.95, 1.00]	0.91	[0.88, 0.94]	0.86	[0.82, 0.90]
Grades	0.68	[0.62, 0.75]	0.62	[0.56, 0.69]	0.49	[0.42, 0.58]
Religiosity factors						
Public	0.93	[0.89, 0.97]	0.94	[0.90, 0.99]	0.86	[0.79, 0.93]
Private	0.86	[0.83, 0.90]	0.97	[0.92, 1.03]	0.92	[0.85, 0.99]

Note. Reference = class 1 (normative). Risk ratios in boldface are significant at $p < .05$ or lower.

however, in terms of the strength of the association, substantially higher risk ratios were identified for risk propensity, lifetime depression, and lifetime anxiety among the severe class when compared to the substance user and violent offender classes, which were relatively similar to one another. With respect to parental factors, compared to the normative class, membership in the severe class was significantly associated with the decreased likelihood of both parental support (RR = 0.85, CI = [0.81, 0.89]) and control (RR = 0.89, CI = [0.80, 0.99]). While significant associations were identified in terms of parental support among substance user (RR = 0.93, CI = [0.90, 0.96]) and violent offender youth (RR = 0.89, CI = [0.85, 0.92]), no significant associations were identified in terms of parental control. As for academic factors, compared to the normative class, membership in the violent offender (RR = 0.91, CI = [0.88, 0.94]) and severe (RR = 0.86, CI = [0.82, 0.90]) classes was significantly associated with the lower levels of academic engagement. Compared with youth in the normative class, membership in all three externalizing classes was significantly associated with lower grades. Notably, the magnitude of this relationship increased steadily among youth in the substance user (RR = 0.68, CI = [0.62, 0.75]), violent offender (RR = 0.62, CI = [0.56, 0.69]), and severe classes (RR = 0.49, CI = [0.42, 0.58]). Finally, in terms of religiosity, membership and all three externalizing classes were significantly associated with the decreased likelihood of public religious participation. Additionally, compared to the normative class, members of the substance user

Table 4. Ratio of Severe 5% to Full Sample Stratified by Gender.

	Male Adolescents			Female Adolescents			Full Sample Adolescents		
	Severe (4.7%)	Full Sample	Ratio	Severe (4.7%)	Full Sample	Ratio	Severe (4.7%)	Full Sample	Ratio
Tobacco use	509	2,040	24.95%	284	1,537	18.48%	793	3,577	22.17%
Alcohol use	504	2,724	18.50%	308	2,801	11.00%	812	5,525	14.70%
Marijuana use	498	1,148	43.38%	290	1,237	23.44%	788	2,752	28.63%
Inhalant use	93	285	32.63%	98	396	24.75%	191	681	28.05%
Hallucinogen use	164	284	57.75%	120	278	43.16%	284	562	50.53%
Truancy	144	872	16.51%	104	881	37.41%	248	1,753	14.15%
Theft	241	504	47.82%	142	289	49.13%	383	793	48.30%
Sold drugs	287	407	70.52%	136	195	69.74%	423	602	70.27%
Carry handgun	193	521	37.04%	46	110	41.82%	239	631	37.88%
Fighting	419	2,316	18.09%	251	1,564	16.05%	670	3,880	17.27%
Group fighting	381	1,469	25.94%	209	1,164	17.95%	590	2,633	22.41%
Severe violence	237	815	29.08%	163	548	29.74%	400	1,363	29.35%
Total	3,670	13,385	27.42%	2,151	11,000	19.55%	5,821	24,752	23.52%

(RR = 0.86, CI = [0.83, 0.90]) and severe classes (RR = 0.92, CI = [0.85, 0.99]) were significantly less likely to report elevated levels of private religiosity.

Ratio of Severe Class to Full Sample Stratified by Gender

Table 4 displays comparative results of externalizing behavior ratios for the severe group and the full sample. The severe group of 4.7% accounted for between 14.17% and 70.27% for each of the externalizing behavior. Overall, the severe group accounted for five times their number in externalizing behaviors, with more common behaviors such as alcohol use were lower, while more serious forms like selling drugs and theft were higher. With respect to gender, females in the severe group were comparatively similar to their male counterparts accounting for large proportions of externalizing behaviors.

Discussion

Theory and research in criminology and psychology have been greatly influenced by the empirical observation that a small subset of individuals, typically ranging from 3% to 10%, account for a disproportionate share of problem behavior. The watershed moment for this line of research occurred four decades ago when Wolfgang, Figlio, and Sellin (1972) identified a small group of adolescents—6% in the 1945 Philadelphia birth cohort of nearly 10,000 boys—who contributed greatly to crime and violence. In this analysis, we build on a long line of research and provide a downward extension on the severe 5.3% found in a nationally representative sample of adults (Vaughn et al., 2011) by identifying a severe 5% (actual 4.7%) in a completely different nationally representative sample of adolescents.

This study demonstrates that relatively unique subgroups exist along the externalizing spectrum, suggesting that there is substantial heterogeneity in forms of externalizing. In fact, the distribution of externalizing in this sample was more Paretian than Gaussian (normal). This was ideal for our study

goal since if the distribution was multivariate normal in terms of externalizing behaviors, there would have been a good chance that all we would have identified was a continuum of roughly equal segments (e.g., low, medium-low, medium-high, and high). Four latent classes were identified with a normative class comprising a large proportion reporting relatively low levels of involvement across measured externalizing behaviors (also see, Vaughn, Fu, et al., 2011). The second latent class identified was similar to the severe class with respect to tobacco, alcohol, and marijuana use; however, other externalizing behaviors were low. The third latent class reported high levels of fighting and violence but was otherwise dissimilar to the severe group. The severe group was high and versatile across the externalizing spectrum. Interestingly, the severe group, though largely male, was comprised of a significant number of females. Also of interest demographically is that the severe group was similar in terms of racial and ethnic composition as the normative group. On the face of it, these findings suggest that the severe 5% is perhaps more reflective of the population than commonly believed. However, regression results did indicate that males were 76% more likely and African Americans were approximately twice as likely as Whites to be members of this class compared to the normative class. As such, this may have numerous implications for research on race and crime. With regard to mental health, internalizing symptoms expressed as anxiety and depression were associated with greater than twofold probability of severe class membership. Compared to other classes, the severe group was more likely to report less parental supervision; however, this effect was small. Lower grades in school were more pronounced in the severe group, reflecting the firmly established link between delinquency and poor school performance (Lipsey & Derzon, 1998). Religiosity factors, though significantly lower than the normative group, were similar in effect to that of the other classes and small in magnitude.

We also were interested in the ratio of each reported externalizing behaviors that the male and female members of the severe 5% accounted for compared to the rest of the sample. As expected, the severe 5% accounted for a large share of externalizing particularly more serious forms. Interestingly, these comparisons show that the female involvement in serious delinquency is not trivial. Although some research seriously challenge the notion that females are represented at all among the most violent and pathological offenders (e.g., Eme, 2010), there is also evidence that while their numbers pale to their male peers, women are found among severe offenders (Blackburn & Trulson, 2010; DeLisi, 2002). For instance, DeLisi (2002) interviewed 55 adult female criminals who averaged nearly 48 career arrests. These women were versatile, chronic offenders who engaged in serious forms of violence such as armed robbery and aggravated assault. The current data are a potential glimpse at fledgling female career criminals during their adolescence and warrant future empirical investigation.

A Role for Prevention?

The desired destination of any rational crime policy is prevention and early treatment (Rocque, Welsh, & Raine, 2012; Welsh & Farrington, 2012). In our view, the lion's share of resources should be focused on the severe 5%. From a public health model perspective, this would be considered a tertiary or indicated secondary or selected population. Despite spending hundreds of millions of dollars on delinquency prevention, it is likely that much of this spending is unguided by research findings (Greenwood, 2006). Although explicit prevention studies of individuals comprising the severe 5% have not been conducted, other preventive interventions and treatments involving antisocial and conduct disordered youth have been carried out. It is plausible that many of these studies have involved children and adolescents who fall into the severe 5%. The first phase of prevention and treatment is early identification and screening. In a study assessing whether screening could usefully identify kindergarten children for school-based prevention services using a two-step screening approach for externalizing behavior problems, Lochman (1995) reported that negative behavior

problems could be predicted up to 1 year later, though there were classification inaccuracies resulting in both false positives and false negatives. Once identified, engaging and involving caregivers in scientifically validated prevention is a hurdle in itself and critically important and understudied (Hoagwood, 2005).

Assuming identification and engagement, the question becomes what is the empirical status of preventive intervention and treatments for children and youth? In an overview of 26 meta-analytic studies of treatments for conduct problems that comprised nearly 2,000 individual studies, Litschge, Vaughn, and McCrae (2010) found that although the overall effects were small to moderate in magnitude ($d = .43$), significant variation in effect sizes across major treatment modalities existed. For example, the mean effect size across studies for cognitive-behavioral type treatments was 0.49 but had a range of 0.04–1.10. Notably, in a meta-analysis conducted by Maughan, Christensen, Jenson, Olympia, and Clark (2005) on behavioral parent training for externalizing behavior, the authors found an overall significant between-subject effect of .30 (95% CI = [0.21, 0.39]) corresponding to a small to medium impact. Other reviews of parent training have found a similar effect size (Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009). Although primary research and meta-analytic studies examining effects of primary, secondary, and tertiary preventive interventions point to overall small to moderate effects, delinquency prevention and intervention research is currently lacking the specificity of being able to identify which interventions work for whom. Very few studies examine differential effects of interventions between different profiles of children and youth. Future prevention and treatment research that are considered promising, such as home visits by nurses and parent training and behavior management, could fruitfully assess the effects of interventions on children and adolescents who fit the severe 5% profile, thus linking population-based research, robust criminological findings, and applied intervention.

Study Limitations and Assets

Although the size and scope of the NSDUH provides strong generalizability, there are important limitations of the current effort that we hope can inform future work in this area. First, and most importantly, the data used in this study were cross sectional, thus preventing not only an assessment of the temporal relationships between variables but also a temporal look at the unfolding of identified groups over time including their stability. Although we replicated study findings in year 2009 NSDUH data involving an entirely different sample of adolescents that resulted in a similar pattern, we have no way of knowing whether these adolescents will continue these behaviors into the adult years. Further, we know little about the onset of externalizing behavior, which, as a cardinal feature of severe antisociality, typically occurs early in the life course. Another important limitation is the reliance on self-reports. Despite the fact that the NSDUH is a long-running survey with strong assessment procedures, there is no doubt error was expressed due to over- and underreporting of behaviors.

In sum, the current study contributes new knowledge toward understanding the epidemiology of severe behaviorally impaired individuals in the United States. Although their prevalence is small in an epidemiological sense, their prevalence is sizable when the impact of their antisocial behavior is considered. As Vaughn and his colleagues (2011), advised, “Although only 5% of the sample, in practical terms this means that on average there is a child in every classroom that is part of this [severe 5%] subset” (p. 79). The current findings validate earlier research of a severe subgroup among adults with a large-scale juvenile sample. It is critical that this group receive interventions to mitigate their risk of developing into pathological career criminals.

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) disclosed the receipt of the following financial support for the research, authorship, and/or publication of this article: Received Post-doctoral grant funding (Maynard) from the Institute of Education Sciences, grant # R324B080008.

References

- Amirault, J., & Lussier, P. (2011). Population heterogeneity, state dependence and sexual offender recidivism: The aging process and the lost predictive impact of prior criminal charges over time. *Journal of Criminal Justice, 39*, 344–354.
- Barkley, R. A. (2005). *ADHD and the nature of self-control*. New York, NY: The Guilford Press.
- Barratt, E. S. (1994). Impulsiveness and aggression. In J. Monahan & H. J. Steadman (Eds.), *Violence and mental disorder: Developments in risk assessment* (pp. 61–79). Chicago, IL: University of Chicago Press.
- Belsky, J., & Pluess, M. (2011). Differential susceptibility to long-term effects of quality of child care on externalizing behavior in adolescence? *International Journal of Behavioral Development, 36*, 2–10.
- Berg, M. T., & DeLisi, M. (2005). Do career criminals exist in rural America? *Journal of Criminal Justice, 33*, 317–325.
- Blackburn, A. G., & Trulson, C. R. (2010). Sugar and spice and everything nice? Exploring institutional misconduct among serious and violent female delinquents. *Journal of Criminal Justice, 38*, 1132–1140.
- Brame, R., Mazerolle, P., & Piquero, A. R. (2010). Criminal career progression among serious youthful offenders in Australia. *Journal of Criminal Justice, 38*, 340–347.
- Brower, M. C., & Price, B. H. (2001). Neuropsychiatry of frontal lobe dysfunction in violent and criminal behaviour: A critical review. *Journal of Neurology & Neurosurgical Psychiatry, 71*, 720–726.
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology, 12*, 467–488.
- Cohen, M. A. (1998). The monetary value of saving a high-risk youth. *Journal of Quantitative Criminology, 14*, 5–33.
- Cohen, M. A., & Piquero, A. R. (2009). New evidence on the monetary value of saving a high-risk youth. *Journal of Quantitative Criminology, 25*, 25–49.
- DeLisi, M. (2001). Extreme career criminals. *American Journal of Criminal Justice, 25*, 239–252.
- DeLisi, M. (2002). Not just a boy's club: An empirical assessment of female career criminals. *Women & Criminal Justice, 13*, 27–45.
- DeLisi, M. (2005). *Career criminals in society*. Thousand Oaks, CA: Sage.
- DeLisi, M., & Gatling, J. M. (2003). Who pays for a life of crime? An empirical assessment of the assorted victimization costs posed by career criminals. *Criminal Justice Studies, 16*, 283–293.
- DeLisi, M., Kosloski, A., Sween, M., Hachmeister, E., Moore, M., & Drury, A. (2010). Murder by numbers: Monetary costs imposed by a sample of homicide offenders. *The Journal of Forensic Psychiatry & Psychology, 21*, 501–513.
- DeLisi, M., & Piquero, A. R. (2011). New frontiers in criminal careers research, 2000–2011: A state-of-the-art review. *Journal of Criminal Justice, 39*, 289–301.
- DeLisi, M., Vaughn, M. G., Beaver, K. M., Wexler, J., Barth, A., & Fletcher, J. (2011). Fledgling psychopathy in the classroom: ADHD subtypes, psychopathy, and educational outcomes in a community sample of adolescents. *Youth Violence and Juvenile Justice, 9*, 43–58.
- Dick, D. M., Aliev, F., Wang, J. C., Grucza, R. A., Schuckit, M., Kuperman, S., . . . Goate, A. (2008). Using dimensional models of externalizing psychopathology to aid in gene identification. *Archives of General Psychiatry, 65*, 310–318.
- Dodge, K. A. (2009). Community prevention and public policy in the prevention of antisocial behavior. *Journal of Child Psychology and Psychiatry, 50*, 194–200.

- Dodge, K. A., & Sherrill, M. R. (2007). The interaction of nature and nurture in antisocial behavior. In D. J. Flannery, A. T. Vazsonyi & I. D. Waldman (Eds.), *The Cambridge handbook of violent behavior and aggression* (pp. 215–244). New York, NY: Cambridge University Press.
- Eme, R. (2010). Male life-course-persistent antisocial behavior: The most important pediatric mental health problem. *Archives of Pediatrics and Adolescent Medicine*, *164*, 486–487.
- Fergusson, D. M., & Horwood, L. J. (1998). Early conduct problems and later life opportunities. *Journal of Child Psychology and Psychiatry*, *39*, 1097–1108.
- Fishbein, D. (2000). Neuropsychological function, drug abuse, and violence: A conceptual framework. *Criminal Justice and Behavior*, *27*, 139–159.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Greenwood, P. W. (2006). *Changing lives: Delinquency prevention as crime-control policy*. Chicago, IL: University of Chicago Press.
- Hicks, B. M., Krueger, R. F., Iacono, W. G., McGue, M., & Patrick, C. J. (2004). Family transmission and heritability of externalizing disorders: A twin-family study. *Archives of General Psychiatry*, *61*, 922–928.
- Hinshaw, S. P. (2002). Process, mechanism, and explanation related to externalizing behavior in developmental psychopathology. *Journal of Abnormal Child Psychology*, *30*, 431–446.
- Hoagwood, K. E. (2005). Family-based services in children's mental health: A research review and synthesis. *Journal of Child Psychology and Psychiatry*, *48*, 690–713.
- Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior, and personality: Modeling the externalizing spectrum. *Journal of Abnormal Psychology*, *111*, 411–424.
- Krueger, R. F., Markon, K. E., Patrick, C. J., & Iacono, W. G. (2005). Externalizing psychopathology in adulthood: A dimensional spectrum conceptualization and its implications for DSM-V. *Journal of Abnormal Psychology*, *114*, 537–550.
- Krueger, R. F., Markon, K. E., Patrick, C. J., Benning, S. D., & Kramer, M. (2007). Linking antisocial behavior, substance use, and personality: An integrative quantitative model of the adult externalizing spectrum. *Journal of Abnormal Psychology*, *116*, 645–666.
- Lipsey, M. W., & Derzon, J. H. (1998). Predictors of violent or serious delinquency in adolescence and early adulthood. A synthesis of longitudinal research. In R. Loeber & D. P. Farrington (Eds.), *Serious and Violent Juvenile Offenders: Risk factors and successful interventions*. Thousand Oaks, CA: Sage.
- Litschge, C. M., Vaughn, M. G., & McCrae, C. (2010). The empirical status of interventions for children and youth with conduct problems: An overview of meta-analytic studies. *Research on Social Work Practice*, *20*, 21–35.
- Lochman, J. E. (1995). Screening of child behavior problems for prevention programs at school entry. *Journal of Consulting and Clinical Psychology*, *63*, 549–559.
- Loeber, R., & Farrington, D. P. (Eds.) (1998). *Serious and violent juvenile offenders: Risk factors and successful interventions*. Thousand Oaks, CA: Sage.
- Lussier, P., Bouchard, M., & Beauregard, E. (2011). Patterns of criminal achievement in sexual offending: Unravelling the “successful” sex offender. *Journal of Criminal Justice*, *39*, 433–444.
- Markon, K. E., & Krueger, R. F. (2005). Categorical and continuous models of liability to externalizing disorders: A direct comparison to NESARC. *Archives of General Psychiatry*, *62*, 1352–1359.
- Maughan, D. R., Christensen, E., Jenson, W. R., Olympia, D., & Clark, E. (2005). Behavioral parent training as a treatment for externalizing behaviors and disruptive behavior disorders: A meta-analysis. *School Psychology Review*, *34*, 267–286.
- McLachlan, G., & Peel, D. (2000). *Finite mixture models*. New York, NY: John Wiley & Sons.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, *100*, 674–701.
- Moffitt, T. E. (2003). Life-course-persistent and adolescence-limited antisocial behavior: A 10-year research review and a research agenda. In B. B. Lahey, T. E. Moffitt & A. Caspi (Eds.), *Causes of conduct disorder and juvenile delinquency* (pp. 49–75). New York, NY: The Guilford Press.

- Nylund, K. L., Asparouhov, T., & Muthen, B. O. (2007). Deciding on the number of classes and latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling, 14*, 535–569.
- Pedneault, A., Harris, D. A., & Knight, R. A. (2012). Toward a typology of sexual burglary: Latent class findings. *Journal of Criminal Justice, 40*, 278–284.
- Piquero, A. R., Farrington, D. P., & Blumstein, A. (2007). *Key issues in criminal career research: New analyses of the cambridge study in delinquent development*. New York, NY: Cambridge University Press.
- Piquero, A. R., Farrington, D. P., Welsh, B. C., Tremblay, R., & Jennings, W. G. (2009). Effects of early family/parent training programs on antisocial behavior and delinquency. *Journal of Experimental Criminology, 5*, 83–120.
- Polit, D. F. (2010). *Statistics and data analysis for nursing research* (2nd ed.). New York, NY: Pearson.
- Ribeiro da Silva, D., Rijo, D., & Salekin, R. T. (2012). Child and adolescent psychopathy: A state-of-the-art reflection on the construct and etiological theories. *Journal of Criminal Justice, 40*, 269–277.
- Rocque, M., Welsh, B. C., & Raine, A. (2012). Biosocial criminology and modern crime prevention. *Journal of Criminal Justice, 40*, 306–312.
- Salekin, R. T., & Lynam, D. R. (Eds.). (2010). *Handbook of child and adolescent psychopathy*. New York, NY: The Guilford Press.
- Sorensen, J. R., Cunningham, M. D., Vigen, M. P., & Woods, S. O. (2011). Serious assaults on prison staff: A descriptive analysis. *Journal of Criminal Justice, 39*, 143–150.
- Sorensen, J., & Davis, J. (2011). Violent criminals locked up: Examining the effect of incarceration on behavioral continuity. *Journal of Criminal Justice, 39*, 151–158.
- StataCorp. (2011). *Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP.
- Stephens, S. H., Hoft, N. R., Schlaepfer, I. R., Young, S. E., Corley, R. C., McQueen, M. B., . . . Ehringer, M. A. (2012). Externalizing behaviors are associated with SNPs in the CHRNA5/CHRNA3/CHRNA4 gene cluster. *Behavior Genetics, 42*, 402–414.
- Substance Abuse and Mental Health Services Administration (SAMHSA) (2011). *Results from the 2010 national survey on drug use and health: Summary of national findings*. Rockville, MD: Substance Abuse and Mental Health Services Administration.
- Tarter, R. E., Kirisci, L., Mezzich, A., Cornelius, J., Pajer, K., Vanyukov, M., . . . Clark, D. B. (2003). Neurobehavior disinhibition in childhood predicts early age onset substance use disorder. *American Journal of Psychiatry, 160*, 1078–1085.
- Thornberry, T. P., Huizinga, D., & Loeber, R. (1995). The prevention of serious delinquency and violence: Implications from the program of research on the causes and correlates of delinquency. In J. C. Howell, B. Krisberg, J. D. Hawkins & J. J. Wilson (Eds.), *Sourcebook on serious, violent and chronic juvenile offenders* (pp. 213–237). Thousand Oaks, CA: Sage.
- Tracy, P. E., Wolfgang, M. E., & Figlio, R. M. (1990). *Delinquency careers in two birth cohorts*. New York, NY: Plenum Press.
- Vaske, J., Ward, J. T., Boisvert, D., & Wright, J. P. (2012). The stability of risk-seeking from adolescence to emerging adulthood. *Journal of Criminal Justice, 40*, 313–322.
- Vaughn, M. G., Beaver, K. M., DeLisi, M., & Wright, J. P. (2009). Identifying latent classes of behavioral risk based on early childhood manifestations of self-control. *Youth Violence and Juvenile Justice, 7*, 16–31.
- Vaughn, M. G., & DeLisi, M. (2008). Were Wolfgang's chronic offenders psychopaths? On the convergent validity between psychopathy and career criminality. *Journal of Criminal Justice, 36*, 33–42.
- Vaughn, M. G., DeLisi, M., Gunter, T., Fu, Q., Beaver, K. M., Perron, B. E., & Howard, M. O. (2011). The severe 5%: A latent class analysis of the externalizing spectrum in the United States. *Journal of Criminal Justice, 39*, 75–80.
- Vaughn, M. G., Freedenthal, S., Jenson, J. M., & Howard, M. O. (2007). Psychiatric symptoms and substance use among juvenile offenders: A latent profile investigation. *Criminal Justice and Behavior, 34*, 1296–1312.

- Vaughn, M. G., Fu, Q., Wernet, S. J., DeLisi, M., Beaver, K. M., Perron, B. E., & Howard, M. O. (2011). Characteristics of abstainers from substance use and antisocial behavior in the United States. *Journal of Criminal Justice, 39*, 212–217.
- Vaughn, M. G., Perron, B. E., Beaver, K. M., DeLisi, M., & Wexler, J. (2010). Transactional pathways in the development of externalizing behaviors in a sample of kindergarten children with impaired self-control. In V. G. Massari (Ed.), *Control theory and its applications*. New York, NY: Nova Science Publishers.
- Vermunt, J. K., & Magidson, J. (2008). *LG-syntax user's guide: Manual for latent GOLD 4.5 syntax module*. Belmont, MA: Statistical Innovations Inc.
- Walters, G. D. (2012). Taxometrics and criminal justice: Assessing the latent structure of crime-related constructs. *Journal of Criminal Justice, 40*, 10–20.
- Welsh, B. C., & Farrington, D. P. (2012). Science, politics, and crime prevention: Toward a new crime policy. *Journal of Criminal Justice, 40*, 128–133.
- Wolfgang, M. E., Figlio, R. M., & Sellin, T. (1972). *Delinquency in a birth cohort*. Chicago: University of Chicago Press.
- Yang, C. (2006). Evaluating latent class analyses in qualitative phenotype identification. *Computational Statistics & Data Analysis, 50*, 1090–1104.
- Zhang, J., & Kai, F. Y. (1998). What's the relative risk? *Journal of the American Medical Association, 280*(19), 1690–1691.

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