

Unexamined Youth of the Juvenile Justice System:
An Examination of the Prevalence of Unspecified Disruptive, Impulse-Control, and Conduct
Disorder Diagnosis

by
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ABSTRACT

The Juvenile Justice System (JJS) has a disproportionate number of youths with mental health concerns. Studies have shown that up to 98% of incarcerated youth have a mental illness diagnosis (Harzke et al., 2012). Multiple factors lead to high rates of diagnoses; one being that the juveniles who conduct delinquent acts have multiple mental health concerns which leads to the high rates of mental illness in the system. The second reason is a legal one; assigning a diagnosis can lead to a better understanding of the youth's problems and needs, which helps to provide them the correct treatment (Haney-Caron, 2016). The aims of the current study were to explore an administrative sample provided by Harris County Juvenile Probation Department (HCJPD) and specifically examine youth with Unspecified Disruptive, Impulse-Control, and Conduct Disorder (UDICCD). Findings from aim 1 of the study identified gender differences in type of diagnosis the youth received. Results of aim 2 suggested that the youth from HCJPD could be stratified, based on the analyses presented here, into three classes: low-functioning, high-functioning, and internalizing classes. The statistical analyses used for aim 3 did not produce a result using the current dataset due to technical difficulties. The implications of the current findings are discussed.

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The United States has the largest juvenile justice system (JJS) of all the industrialized countries in the world (Bochenek, 2016). Juvenile crime rates have been falling consistently since the 1990's (Unruh & Bullis, 2005), yet more juveniles are being processed by the JJS (Harms, 2002). Perhaps it is because, at least in part, that certain historical precipitators have resulted in a system more focused on punitive justice versus rehabilitation (Fried & Reppucci, 2001). Due to a surge in juvenile delinquency from 1985-1993 many states in the 1990s passed punitive legislation that was aimed at incapacitating dangerous youths as well as deterring future adolescent offenders (Zimring & Rushin, 2013). While there have been efforts from the beginning of the 21st century to reverse the effects of a more punitive system (Merlo & Benekos, 2010), earlier state laws still impact school practices (e.g., with the implementation of zero-tolerance policies). Zero-tolerance policies are used in many schools, the result of which are high suspension and expulsion rates, specifically for minority students (Thompson, 2016; Wald & Losen, 2003). In turn, such school policies lead to the emergence of the so-called school-to-prison pipeline, with school administrators and teachers pushing youth from the school system by suspending or expelling them, transferring to alternative schools, and/or having them arrested for minor offenses (May, 2018; Wald & Losen, 2003). In short, zero-tolerance policies result in an increasing number of youth being fed into the prison system through their schools (Wald & Losen, 2003).

There are many known negative facets to youth incarceration, from negative peer effects to the cost of maintaining youth in detention facilities. Specifically, there is strong evidence for peer influence in juvenile correctional facilities (Bayer,

Hjalmarsson, & Pozen, 2009). Thus, if a juvenile is exposed to a peer that committed the same type of crime that they have, they are more likely to recidivate with that crime. Formation and expansion of criminal networks, peer reinforcement of addicting behavior, as well as juveniles learning from each other are all hypotheses as to why there are peer effects present in the US JJS (Bayer et al., 2009).

Moreover, there are financial implications. Recent estimates show that across 46 states the average cost of the most expensive confinement per incarcerated youth was \$407.58 per day, \$36,682 per three months, \$73,364 per six months, and \$148,767 per year (Justice Policy Institute, 2014). The same report suggests the long-term costs of juvenile incarceration can range from 8 to 21 billion US\$ per year (Justice Policy Institute, 2014). Long-term costs include price of recidivism, lost future earnings of youth, additional Medicare or Medicaid spending, and other factors (Justice Policy Institute, 2014).

Another significant concern is the overrepresentation of youth with mental health issues in the JJS (Wasserman, McReynolds, Ko, Katz, & Carpenter, 2005). Individuals who have gone through the JJS continued to show higher rates of mental illness five years after leaving the system (Abram et al., 2015). While females had higher rates of comorbidity in detention, males had higher rates of disorders at follow up, and participants with more disorders at baseline were more likely to have a disorder at follow up (Abram et al., 2015). A 2012 study of a Texas correctional facility demonstrated that over 98% of juveniles had a mental illness diagnosis, with the majority being a conduct disorder diagnosis (Harzke et al., 2012). Other studies estimate the prevalence to be about 70% of juveniles having a psychiatric diagnosis,

compared to 9-13% prevalence rate in the general population (Grisso, Vincent, & Seagrave, 2005; Haney-Caron, 2016). Common diagnoses were substance use, bipolar and depressive disorders, and ADHD (Harzke et al., 2012).

Disruptive behavior disorders (DBD) such as oppositional defiant disorder (ODD) and conduct disorder (CD) are of interest when examining the common problems juveniles face. DBD's are often connected to impulsive and aggressive behavior which can lead to offending (Underwood & Washington, 2016). The most well studied and most prevalent DBD diagnoses include ODD and CD, however, intermittent explosive disorder (IED), kleptomania, pyromania, and specified and unspecified disruptive disorders are all in the disruptive, impulse control, and conduct disorder chapter of the DSM-5 (Lenz & Lancaster, 2016). One of the reasons mental illnesses are prevalent in the JJS is that youth in the system have multiple mental health concerns, which leads to the high rates of diagnoses in the system. Another reason is a legal one; assigning a diagnosis can lead to a better understanding of the youth's problems and needs, which helps to provide them the correct treatment (Haney-Caron, 2016). The authors suggest that clinicians should be very careful when assigning a diagnosis to a juvenile because it will impact not only the type of intervention provided but also may bias how the judges and probation officers view the juveniles.

The unspecified category of diagnoses is particularly intriguing; it has been typically used for younger children and groups of people who don't fit the mold of a specific DBD, but are impaired in their day to day life due to the presence of symptoms (Frances, 2013; Lenz & Lancaster, 2016). It can be used as a placeholder in

the face of diagnostic uncertainty, particularly when a fast answer may be wrong. However, the vagueness of the diagnosis and unclear implications for treatment were referred to as rather unhelpful, specifically in forensics, which requires more precision (Frances, 2013; Lenz & Lancaster, 2016).

Descriptive literature on the juvenile delinquent population is prevalent in the field, with papers breaking down the population by ethnicity, age, gender, and type of diagnosis. Harzke et al. (2012) examined a large sample of juveniles from the Texas Juvenile Correctional System and found that the majority of the individuals have a diagnosis of conduct disorder (83%), a substance use disorder (75.6%), a bipolar disorder (18.3%), and a depressive disorder (12.6%). The authors demonstrated that over three quarters of the sample has more than one diagnosis and that females were slightly more likely to have a psychiatric diagnosis. The authors also examined prevalence of diagnosis broken down by gender and ethnicity, suggesting that there are differences based on demographics. For example, non-Hispanic White males showed higher rates of any depressive disorder, any bipolar disorder, any anxiety disorder, and ADHD, while Hispanic males showed higher estimates for any substance use disorder. Prevalence estimates were significantly higher for women for any depressive disorder, any bipolar disorder, and any anxiety disorder, including and excluding PTSD (Harzke et al., 2012). Interestingly, they also identified a group of individuals with a diagnosis of disruptive behavior disorders not otherwise specified (NOS), with 12.3% of men and 13.8% of women receiving that diagnosis.

Two seminal studies have observed similar distributions as well in their population in the Cook County, IL, JJS. Teplin, Abram, McClelland, Dulcan, and

Mericle (2002) worked with a large sample size and a reliable diagnostic instrument, the DISC 2.3. In their sample of 1829 youth, slightly over 40% of males and females had a DBD diagnosis, with the authors providing the percentile only for CD and ODD for the diagnostic category of DBD. The authors found that 66.3% males and 73.8% females had at least one mental illness diagnosis, with 60% having a substance use disorder and 40%—a DBD diagnosis. Another study based on the same sample showed that comorbidity is a common problem in the JJS, where 56.5% of females and 45.9% of males have two or more significant mental health diagnoses (Abram, Teplin, McClelland, & Dulcan, 2003). The minority of youth had only one diagnosis, 17.3% of females and 20.4% of males. Yet another study that recruited 292 youth established that only 32.5% youths had a DBD diagnosis, with the majority of those being CD. Substance use disorder had a prevalence of 50.3% (Wasserman, McReynolds, Lucas, Fisher, & Santos, 2002).

As shown in the literature, disruptive behavior disorders are highly prevalent in youth in the JJS, thus, it is important to examine risk correlates that result in a child developing ODD, CD, or other DBD's. There seem to be certain factors in children's lives commonly associated with these disorders, ranging from having other mental illnesses, to substance use, to callous-unemotional traits, to trauma, to reading and learning disabilities. Callous-unemotional traits are an affective aspect of adult psychopathy and recently researchers have been using psychopathic tendencies to examine predictive validity of antisocial behavior in adolescents through adulthood (Frick & White, 2008; McMahon, Witkiewitz, Kotler, & Conduct Problems Prevention Research, 2010). According to Frick and White (2008), callous-

unemotional traits measured in early adolescence went above and beyond having CD/ADHD in predicting antisocial outcomes, such as delinquency, arrests, and early adult antisocial personality disorder criterion count and diagnosis. Youth with conduct problems who also have CU traits specifically, tend to follow a more severe and stable pattern of antisocial behavior (Frick & White, 2008).

In addition, CD specifically is often comorbid with other mental illnesses, such as ADHD which is also characterized by poor impulse control (Berkout, Young, & Gross, 2011). CD males with ADHD have worse outcomes than CD males without ADHD (Loeber, Burke, Lahey, Winters, & Zera, 2000). In addition, children who have conduct problems are vulnerable to internalizing disorders such as depression as well (McDonough-Caplan, Klein, & Beauchaine, 2018). Research suggests that individuals who develop CD are at increased risk for anxiety (Loeber et al., 2000). Children who had been investigated for maltreatment and later placed into out-of-home care and had a depression diagnosis were 72% more likely to be involved with the JJS (Yampolskaya & Chuang, 2012). Girls specifically at probation intake reported more internalizing disorders even when controlled for personal and offense characteristics (Wasserman et al., 2005). In addition, Wasserman et al. (2005) found that females charged with violent offenses were 3 to 5 times more likely to report anxiety disorders.

Often, substance use is a disorder comorbid with DBD's, as well as present in juvenile delinquents (Henry et al., 1993; Wasserman et al., 2005; Yampolskaya & Chuang, 2012; Yoshimasu et al., 2016). Specifically, Yoshimasu et al. (2016) found that ADHD when comorbid with ODD, CD, or depression is more likely to lead to

high substance use. Individuals who had been in out-of-home care and had substance use disorders (SUD) were 85% more likely to be placed in a juvenile justice facility (Yampolskaya & Chuang, 2012). Henry et al. (1993) had found that individuals with early conduct problems and depressive symptoms were more likely to later have substance use problems.

Another prevalent feature of youth in the JJS is that many of the juveniles have experienced traumatic events. While there did not seem to be significantly different PTSD rates between boys and girls, gender differences have been identified in the reported PTSD-triggering events. Specifically, girls were more likely to report forced sexual activity and boys were more likely to report being threatened with a weapon (Wasserman et al., 2005). Children who lost their caregivers and were placed in out-of-home care were almost twice as likely to become involved with the JJS as well (Yampolskaya & Chuang, 2012).

Another risk related to CD was having a reading disorder, even when controlling for SES and ethnicity (Burke, Loeber, & Birmaher, 2002). Learning disabilities were present in 13% to 40% of youth in an incarcerated sample in Connecticut (Grigorenko, Sullivan, & Chapman, 2015). An additional correlate of being in the JJS is having a lower IQ, it has been shown that individuals have significantly lower mean IQ scores than the standardization sample means (Werner, Hart, & Ficke, 2016).

Present Study

Rationale: There is a wide range of literature available on the JJS, with many empirical papers describing the population. The dataset presented in this work is an

administrative dataset provided by the Mental Health Unit at the Harris County juvenile probation department. The Mental Health Unit is for youths with severe mental illnesses, to provide more intense interventions (Harris County Juvenile Probation Department, 2017). According to the 2017 annual report, there were over 11,056 referrals in that year alone to the Harris County Juvenile Probation Department. Thus, a large volume of youth goes through the probation department, which results in data of thousands of youth available from the mental health unit (with some having multiple intakes). This is a unique sample that can provide insight into how youth are processed through the JJS and diagnosed in a naturalistic, not a research study setting. The dataset is a subset of a larger JJS dataset provided by Harris County and it includes various information about this unique sample, such as distribution of diagnoses, IQ, family structure, and academic success.

The distribution of diagnoses in this sample was different, with no descriptive papers on the distribution of diagnoses and comorbidities finding the same pattern. In the Mental Health Unit dataset, the primary diagnosis from the disruptive behavior chapter of DSM-5 was Unspecified Disruptive, Impulse-Control, and Conduct Disorder (UDICCD) diagnosis rather than ODD or CD. In the literature, only one paper also had a number of disruptive behavior disorders not otherwise specified (NOS), which was the Harzke et al. (2012) work described above. They identified a limited number of individuals with the not otherwise specified (NOS) diagnosis (how UDICCD was referred to before DSM-5), with 12.3% of men and 13.8% of women receiving it. Thus, it is of interest to examine why this naturalistic sample has a

different distribution of diagnoses than other studies featuring the JJS population (Abram et al., 2003; Teplin et al., 2002; Wasserman et al., 2002)

The aims of the current project are threefold. The first aim is to examine whether youths with UDICCD differ in terms of demographic characteristics relative to youths with ODD, CD, all DBD, and all other diagnoses not including DBD. The second aim is to compare youths with UDICCD to youths with specified DBD to examine whether they differ based on variables that are associated with DBD's, such as low academic achievement, low age of first truancy, comorbid disorders. Variables selected are discussed in more detail in the data analysis section. It is expected that youth with UDICCD will differ from youth who received a specified DBD diagnosis, including ODD or CD. In pursuing this aim youths with UDICCD will be contrasted with all of the DBD's combined into one group, and with each DBD group separately. Whereas a lot is known about ODD and CD, less is known about youth who were diagnosed with an Unspecified DBD, and researchers indicate that typically individuals with unspecified diagnoses fit less neatly into a particular diagnostic label (Frances, 2013; Lenz & Lancaster, 2016). Thus, the youth with UDICCD should differ from the youth with other DBD diagnoses, however, there has not been much data or theoretical background available for specific hypotheses for differences. The last aim is to examine whether the youth with UDICCD are homogenous or heterogenous. The unspecified diagnosis in youth, to the best of our knowledge, has not been explored before, thus the analyses will be exploratory in nature and will help to better understand the composition of the youth with UDICCD based on demographic

variables, such as gender, race, age, as well as variables such as IQ and type of academic achievement.

Method

Participants

The sample is from an administrative dataset, provided by the Mental Health Unit from the Harris County Juvenile Probation Department. The entire sample had an $N = 4644$, however numerous youths had more than one entry into the system. Once the data were sorted by ID and first detention record in the system, $N = 3560$ ($M = 15.38$, $SD = 1.12$) individual cases remained. Outliers over 17 years old were removed from the sample, thus youth ranged from 10 to 17 years old. Males composed 83.62% of the sample. The racial breakdown was as follows: 51.46% African American, 19.07% Latinx, and 28.79% White. The majority of youth have multiple diagnoses, up to six in certain cases. The DBD subgroup ($N = 3147$) included a large number of youths with UDICCD; there were 2224 youth ($M = 15.43$, $SD = 1.08$) who had a diagnosis of UDICCD. For the majority of them, it was one of their primary three diagnoses (youth can have up to six mental illness diagnoses, their first three were considered their primary three diagnoses). The distribution of gender, age, and race is similar to that of the entire sample, with the UDICCD sample being predominantly male (85.86%). The racial breakdown is similar to that of the entire sample: 51.91% African American, 19.95% Latinx and 27.56% Caucasian.

Assessments

The data were collected through an unstructured interview conducted by master's level or PhD level clinicians. This information was collected for any juvenile referred to the Harris County Juvenile Probation Department, however, the subset of the dataset used in these analyses pertains specifically to the youth who had been placed into the Mental Health Unit. Family, academic, social, and medical history were collected through a computer-administrated self-report assessment. The assessment is divided into sections and the data were stored in separate text files. The sections are as follows: charges, family, school, social, emotional, mental health history, medication, substance use, behavioral, diagnosis, risk factors, symptoms (by specific disorder), recommendations, testing, medical history, trauma. The separate files were compiled into one major dataset for ease of use. In addition, the individuals were sorted by ID and date of entry into the system, and the data were subset so only one detention record per child was included in the analyses, specifically their first detention record in the system.

Massachusetts Youth Screening Instrument, Second Version (MAYSI-2). The MAYSI is a brief, 52 questions screening tool used to identify potential mental health concerns in the juvenile justice system. It is a well-validated and reliable tool primarily used by the JJS (Grisso, Barnum, Fletcher, Cauffman, & Peuschold, 2001).

Test of Nonverbal Intelligence, 4th edition (TONI-4). The TONI-4 is a nonverbal test of intelligence that was created by Brown, Sherbenou, and Johnsen (2010) for individuals aged 6-89 years old. The test was designed to assess problem-solving and abstract reasoning abilities without requiring reading or writing ability.

Specifically, all instructions are provided in pantomime and the participants answer by pointing, nodding, or blinking. Internal consistency scores are satisfactory (.94 to .97) and correlation coefficients with other nonverbal intelligence tests are adequate as well, ranging from .73 to .79 (Mungkhethklang, Crewther, Bavin, Goharpey, & Parsons, 2016).

Wide Range Achievement Test 4 (WRAT4). The WRAT4 is a measure used to assess basic academic skills of reading, spelling, and math in individuals aged 5 to 94 (Wilkinson & Robertson, 2006). The WRAT4 is a fast, simple, and psychometrically sound measure that can be used in diagnosing learning disabilities, assessing academic progress over time, and evaluating achievement/ability discrepancies (Wilkinson & Robertson, 2006).

Data Analytic Plan

Aim 1 was addressed using chi-square tests of independence to evaluate whether there were statistically significant demographic (e.g. gender, age, race) differences between youths with different diagnoses, specifically youths with UDICCD and youths with specified DBD's. Statistically significant findings were followed up with post-hoc pairwise analyses. Follow up pairwise comparisons were conducted controlling the experiment-wise alpha using the Bonferroni procedure, with results having to be significant at the $.05/2 = .025$ level (Hays, 1994). First, all DBD's aside from UDICCD were combined to see whether there were overall differences between gender and receiving a specified versus unspecified diagnosis. Then, we compared specific diagnoses for men and women: Unspecified and ODD, Unspecified

and CD, Unspecified and all other DBD's not analyzed separately above (pyromania, kleptomania, intermittent explosive disorder, other-specified disruptive, impulse-control, and conduct disorder).

For aim 2, a latent variable mixture modeling was used to model heterogeneity within youths with UDICCD and youths with specific DBDs. In other words, we examined whether it is possible to classify youths with UDICCD and DBDs to unobserved groups (latent classes) with similar patterns using selected variables, such as comorbid internalizing disorders (anxiety/depression), MAYSI scores, academic abilities, age of first truancy, trauma, family structure, IQ, prior involvement in the JJS, animal cruelty, various social skills such as gang membership, and substance use. Covariates were included in the models to explore demographic differences across the classes. In examining a number of possible latent class, we discontinued increasing the number of classes in the model if the solution was not replicated and thus was untrustworthy due to local maxima even with large random starts values. In addition, Petscher, Schatschneider, and Compton (2013) indicate that the first time the LMR is insignificant may be a good indication to discontinue increasing the number of classes.

For aim 3, the youth with UDICCD were examined and classified within the group. Specifically, we conducted hierarchical cluster analyses to examine how youth with the UDICCD diagnosis group together on selected demographic variables, such as gender, race, age, IQ. The goal was to understand the extent of variation among youth in the UDICCD and whether the group was homogenous or heterogenous in nature. Given that the work is exploratory, due to there not being much available

literature on individuals with UDICCD, analyses were to be corrected for multiple comparisons and adjusted for false discovery rates.

Aims 1 and 3 were addressed using the PROC FREQ and PROC CLUSTER procedures respectively in SAS software, Version 9.4 of the SAS System for Windows. Aim 2 was addressed using a mixture modeling approach in Mplus 7.2 (Muthén & Muthén, 1998-2015).

Results

Aim 1

Diagnosis (unspecified versus any other disruptive behavior disorder) and sex were significantly related when a chi-square of independence was conducted, $\chi^2(1, N = 3147) = 16.63, p < .001$. A larger number of men than women received the Unspecified DBD relative to specific DBD diagnoses, $\chi^2(1, N = 2195) = 5.48, p = .02$. In addition, women were more likely to receive a specified DBD, $\chi^2(1, N = 952) = 11.096, p = .001$ than an Unspecified diagnosis.

The percentage of men and women differed significantly when comparing prevalence of UDICCD and ODD, $\chi^2(1, N = 2978) = 25.03, p < .001$. Women were more likely to receive a diagnosis of ODD rather than UDICCD, $\chi^2(1, N = 482) = 22.50, p < .001$. Statistically non-significant relations were found with regards to men and diagnosis they were more likely to receive, UDICCD or ODD, $\chi^2(1, N = 2496) = 2.84, p = .092$. There were statistically non-significant relations between gender and CD ($\chi^2(1, N = 2293) = 1.22, p = .27$) or gender and all other DBD's combined

(pyromania, kleptomania, intermittent explosive disorder, other-specified disruptive, impulse-control, and conduct disorder), $X^2 (1, N = 2234) = 1.26, p = .26$.

There were statistically non-significant relations for race and type of DBD diagnosis, unspecified or specified, $X^2 (2, N = 3147) = 2.08, p = .35$. There were statistically non-significant differences by race for ODD diagnosis ($X^2 (2, N = 2978) = 1.19, p = .55$), CD diagnosis ($X^2 (2, N = 2293) = 3.82, p = .15$), or all other DBD's combined ($X^2 (2, N = 2234) = .28, p = .87$).

There were statistically non-significant differences for age (10-13 vs 14-17) and type of DBD diagnosis, $X^2 (1, N = 3147) = .16, p = .69$. There were statistically non-significant differences by age for ODD diagnosis ($X^2 (1, N = 2978) = .01, p = .91$), CD diagnosis ($X^2 (1, N = 2293) = .13, p = .72$), or all other DBD's combined ($X^2 (1, N = 2234) = 2.79, p = .09$).

Aim 2

Model Fit. Table 1 presents fits statistics for the latent class models (from 1-class to 4-class solutions). Fit statistics and model usefulness suggested that the 3-class model was the best fitting. Although (as expected) Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and adjusted BIC decreased with an increasing number of classes, the most meaningful/significant decline was observed up to the 3-class model. Examination of the Lo-Mendell Rubin likelihood ratio tests (VLMR and LMR) and p-value of LMR suggested that the 3-class solution provided the best fit. Entropy suggested that the 3-class model was more useful for distinguishing groups of subjects distinct from each other relative to other computed models.

Description of 3 Classes Based on Juvenile Delinquency Risk Factors.

Figures 1 and 2 suggested that Class 3 was not parallel relative the other two classes indicating a within group/between group interaction. Classes 1 and 2 had a more similar pattern while Class 3 was overall more elevated. Based on the results, patterns emerged for each class, where Class 1 has the lowest IQ and academic achievement scores, most prior involvement with the JJS, and medium levels of emotional/coping issues, thus it can be named the low-functioning class. Class 2 had the highest IQ and academic achievement scores with the least emotional/coping issues (aside from substance use) and the most family support, thus it can be named the high-functioning class. Last, Class 3 had an elevated pattern for emotional/coping variables, specifically internalizing problems (anxiety and depression) and was between Classes 1 and 2 for IQ and academic achievement, as well as prior involvement with JJS and family support. Thus, Class 3 can be the internalizing class.

The internalizing class had the highest scores for gang involvement, self-reported anxiety and depression, was more likely to endorse animal cruelty, exhibited more self-mutilation and suicidal ideation, had the highest current substance use, and had more symptoms of anxiety and depression relative to the low and high-functioning classes. The internalizing class also experienced slightly more trauma (physical, family, community, sexual) relative to the other two. The internalizing class was more likely than the high-functioning though less likely than the low-functioning class to be previously involved in the JJS and had more family support than the low-functioning class but less than the high-functioning class.

The internalizing class also had the highest scores on the MAYSI, for example, individuals in that class were more likely to consume alcohol/drugs than the high and low-functioning classes. The internalizing class had the highest scores for angry-irritable, with high and low-functioning classes having lower scores. The internalizing class had the highest somatic complaints and was the most likely to have thought disturbance (assessed only in boys) while high and low-functioning classes were less likely. The internalizing class and the low-functioning class were more likely to have traumatic experiences than the high functioning class. Just as in the categorical LCA results, the internalizing class has the highest scores on the MAYSI, while the low-functioning class is in the middle and the high-functioning class has the lowest scores (although differences are less noticeable in the categorical variables for the high and low-functioning classes).

The low-functioning class, compared to the high-functioning class, had slightly more gang involvement, and higher self-reported anxiety and depression. The low-functioning class had slightly higher values for animal cruelty and self-mutilation but similar values for suicidal ideation. The high-functioning class had slightly higher substance use than the low-functioning class, while the low-functioning class had more symptoms of depression but similar symptoms of anxiety to the high-functioning class. The low-functioning class had higher family, community, and physical trauma but not sexual trauma. The higher functioning class was less likely to have previously been involved with the JJS and had more family support than the lower-functioning class.

The low-functioning class had the lowest scores for IQ and academic achievement across the board (ranges from Low to Low average). The high-functioning class had the highest scores for IQ and achievement (all in the Average range), while the internalizing class was in between the two, with scores lying in the Low Average to Average range for IQ and academic abilities.

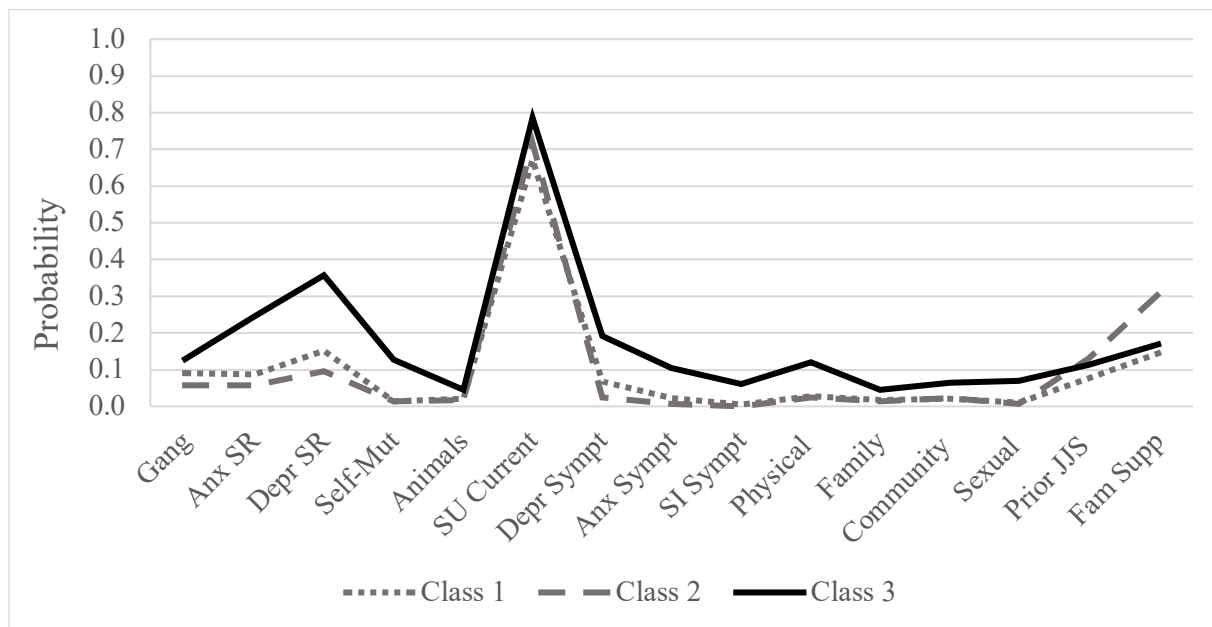


Figure 1. Three-class model of juvenile delinquency risk.

Note: Class 1 = low-functioning, class 2 = high-functioning, class 3 = internalizing. Gang = gang involvement, Anx SR = anxiety self-report, Depr SR = depression self-report, Self-Mut = self-mutilation self-report, Animals = animal cruelty, SU Current = current substance use (past 6 months), Depr Sympt = depression symptoms, Anx Sympt = anxiety symptoms, SI Sympt = suicidal ideation symptoms, Physical = physical trauma, Family = family trauma, Community = community trauma, Sexual = sexual trauma, Prior JJS = no prior juvenile justice system involvement, Fam Supp = family support.

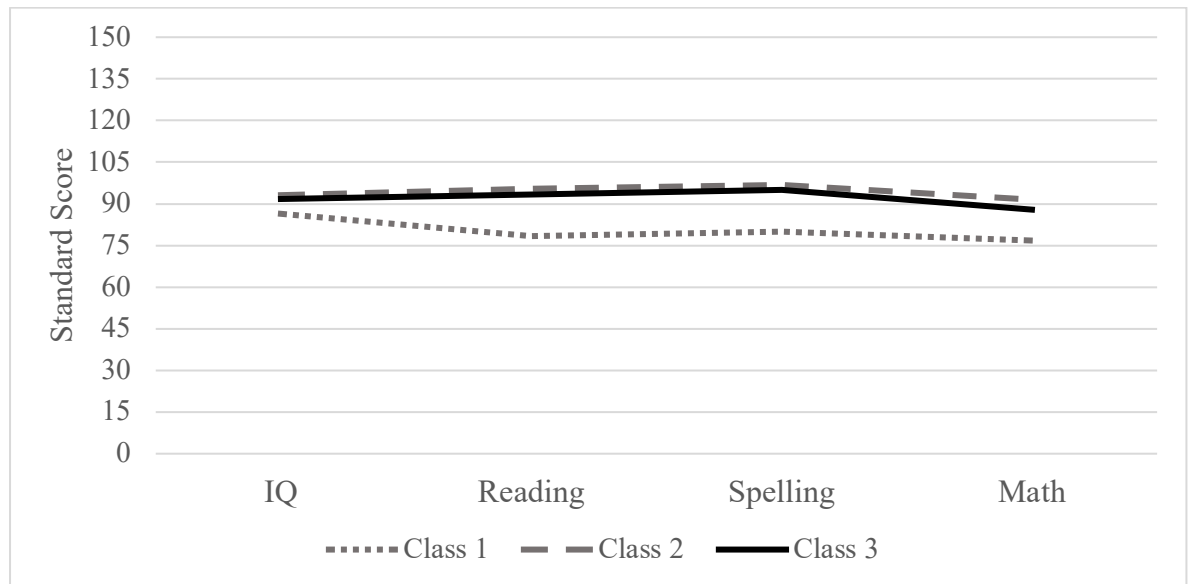


Figure 2. Three-class model of IQ and academic achievement scores as class membership predictors.

Note: Class 1 = low-functioning, class 2 = high-functioning, class 3 = internalizing.

Three Classes and Covariates. Covariates further helped in describing the three classes, see table 3 for distribution of gender and race by latent class. Older youth were more likely to be in the low-functioning class than the high-functioning or internalizing classes. The odds of being in the high-functioning class compared with the low-functioning is 59% smaller for older youth. The odds are 60% smaller for older youth to be in the internalizing class versus the low-functioning class. The log odds ratio of older youth being in the high-functioning class compared with the internalizing class was insignificant.

Men were more likely to be in the low-functioning class than women and less likely to be in the high-functioning or internalizing classes. The odds were 48%

smaller for men to be in the high-functioning class than the low-functioning class¹. The odds are 81% smaller for males to be in the internalizing class versus the low-functioning class. The odds of being in the internalizing class compared with the high functioning class is 64% smaller for men than women.

African American JJS youth are more likely than Latino youth to be in the low-functioning class compared to the internalizing class. The odds are 42% smaller for African Americans to be in the high-functioning class than low-functioning class compared to Latino youth. The odds are 44% smaller for African American youth to be in the internalizing class versus the low-functioning class. African American youth were also slightly more likely to be in the high-functioning class than the internalizing class, the chances of being in the internalizing class compared with the high-functioning class is 4% smaller for African American than Latino youth.

Caucasian JJS youth were less likely to be in the high or low-functioning classes than Latino youth, and they were more likely to be in the internalizing class. The odds are 22% smaller for White youth to be in the low-functioning class than the internalizing class compared to Latinos. The chances are 24% lower for White youth to be in the high-functioning class versus the internalizing class. The odds of being in the high-functioning class compared with the low-functioning class is 3% smaller for White youth than Latino youth.

Aim 3

¹ The probability of a correct response can be obtained by transforming the model-based log of odds using the following formula: $1 - \exp(\text{expected adjusted log odds})$ (De Boeck & Wilson, 2004)

Utilization of a cluster analysis did not produce a result using the current dataset. We continuously received warning messages regarding ties for minimum distance, regardless of which variables were selected for the analysis. We started with the originally proposed variables, which were primarily categorical. However, the output and warning messages indicated there was no accurate clustering occurring in the sample because categorical variables were not discriminative enough. We continued to receive the warning messages with various combinations of variables, including count and continuous types of variables. Unfortunately, the variables in the dataset were not discriminative enough to successfully distinguish meaningful clusters for individuals with the Unspecified diagnosis. Due to the discrete nature of majority of variables, distinguishing clusters was not possible as many observations were the same distance from multiple cluster centers. In other words, the youth were equally likely to belong to more than one cluster.

Discussion

The goal of the current project was to better understand the administrative sample from the Harris County Juvenile Probation Department. The three specific aims were to 1) to examine whether youths with UDICCD differ in terms of demographic characteristics relative to youths with ODD, CD, and other DBD, 2) to compare youths with UDICCD to youths with specified DBD to examine whether they differ based on variables that are associated with DBD's and to generally examine the different classifications within the sample of youth with DBD's, and 3) to examine whether the youth with UDICCD are homogenous or heterogenous.

For aim 1, the results suggested that men were more likely to receive an unspecified diagnosis than a specified disruptive behavioral disorder diagnosis, while women were more likely to receive a specified DBD than unspecified diagnosis. In addition, women were more likely to receive a diagnosis of ODD rather than UDICCD, which may be driving the above results. However, there were no other significant differences based on gender and CD diagnosis or other specific DBD diagnosis. Most likely this is because a very small number of individuals had the CD or other specified diagnosis in the sample and thus no effect was found. Potentially, women were more likely to receive a specified diagnosis rather than UDICCD because women's externalizing behavior is not perceived as disruptive as that of males unless it reaches certain high levels which warrant a specified diagnosis. This may be related to the gender paradox, where women may overall be less likely to receive a DBD diagnosis but when they do, they have more severe problems with a less positive prognosis (Wasserman et al., 2005). Last, there were no differences in likelihood of type of diagnosis by race or by age, which may suggest that the psychologists at the detention center are unbiased in their diagnosing of youth. It could also entail that in the population there are no age or racial differences in diagnosis prevalence. Last, it may be due to the fact the default diagnosis in the system is UDICCD (for various reasons) thus few individuals qualify for a specific diagnosis and thus it is evenly distributed by age and race.

The latent class analysis used categorical, count, and continuous variables to stratify the sample into distinguished classes. Three classes that were significantly different from each other were identified in the sample, which were labeled low-

functioning (due to lower IQ and achievement scores and some elevation on emotional/coping measures), high-functioning (due to higher IQ and achievement scores and lowest elevations on emotional/coping), and the internalizing class, which had the highest scores for emotional/coping and especially anxiety/depression variables. Older youth were more likely to be in the low-functioning class than the high-functioning or internalizing classes. Men were more likely than women to be in the low-functioning class, while women were more likely to be in the internalizing and high-functioning classes. African American JJS youth were more likely than Latino youth to be in the low-functioning class versus internalizing or high-functioning classes. Caucasian JJS youth were less likely to be in the high or low-functioning classes than Latino youth, and they were more likely to be in the internalizing class.

The results provide an interesting look into the JJS in Harris County. First, even with such a large sample size there were only three classes significantly different from each other. Two, the classes did not seem to differ too much in their pattern of results, they were primarily different in level of severity. Thus, we can see that the many risk factors associated with involvement in the juvenile justice system are consistent for all youth involved in the system and diagnosis does not seem to have much of an impact. However, potentially different risks may be more prevalent for men versus women or for different genders or ages. For example, being an older male with lower IQ or achievement scores is a risk for involvement, as is being a younger female with many internalizing issues.

The different classes also have implications for treatment, such as providing more school/tutoring services to the youth with lower achievement scores or providing

more mental health services to youth who score high on the MAYSI or endorse the emotional/coping questions during the intake interviews. Interestingly, the largest percentage of women was in the internalizing class. Thus, there is an overwhelming number of girls in the JJS that have suffered trauma and endorse many internalizing symptoms. It may suggest that women need more specialized treatment in the facility, focusing on their mental health concerns specifically. Previous studies have not found gender differences in PTSD rates (Wasserman et al., 2005), however, in the current study it seems that women are more likely to be in the internalizing class which in turn has the highest trauma and emotional/coping issues. Thus, it will be important to examine why so many females with trauma are present in JJS facilities and whether that is the correct placement for them. Overall, targeting each individual's weaknesses may decrease the time they spend in the facility and/or the chances of them returning to the facility.

Of special interest were the large number of youths who endorsed drinking or taking drugs in the past 6 months as well as the elevated scores on the alcohol/drug index of the MAYSI. The current substance use question had the highest peak in the graph of probabilities, which suggests many of the youth may struggle with SUD. While there are special units at HCJPD for individuals with drug abuse problems, it may be necessary for more youth in the system to receive support for this issue. Future directions should include understanding the type of substances most often abused as well as the motivation behind the substance use (for example, coping mechanism versus peer pressure) because that can influence the type of intervention selected. The youth with UDICCD contribute significantly to the current pattern of results due to

that being the primary diagnosis in the sample. Thus, we can see that while the diagnosis does not provide much information, other aspects of the intake procedure can indicate which services to provide to which youth.

Unfortunately, the data available were not conducive to completing aim 3 successfully with the proposed analytical strategy. The data used were not discriminative enough and the sample too large for a hierarchical cluster analysis procedure. Future directions include completing aim 3 using other statistical procedures. Specifically, the Harris County Juvenile Probation Department will be providing more data of similar nature this year. Thus, we can use machine learning classification techniques to identify patterns in the current data that can later be replicated on the new dataset.

Given the effects that being involved in the JJS has on youth, it is increasingly important to understand the type of youth that enter the system and how to best ensure they do not return to the facilities. The current dataset had an overwhelming number of youths with an UDICCD diagnosis. The unspecified diagnoses do not typically provide much information about the youth on their own, which can impact the types of services the youth may receive. Structured diagnostic tools would be incredibly beneficial in forensic settings due to their reliability and validity (Vacc & Juhnke, 1997) given that youth are provided services and treatment based on their diagnosis. Future research will need to investigate whether similar patterns of diagnosis are identified using structured interviews.

The Unspecified diagnosis does not provide the necessary information needed to implement individualized care to the youth, however, other collected data can fill in

the blanks. The current study provides information for the common problems the juveniles face which can inform future treatment plans. For example, examining IQ or achievement scores can indicate which youth may have difficulties with school and cannot easily access their educational materials, thus providing them with academic interventions is necessary. Identifying youth who endorse multiple diagnoses, emotional/coping issues, trauma, low family support can be informative for providing the best care possible – whether it is providing individual therapy to the youth or multisystemic therapy to those families. Working with administrative samples can provided much needed insight to real-world problems, which will then lead to relevant solutions and treatments.

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Table 1

Fit Statistics for Latent Class Models (1-Class through 4-Class Solutions)

Fit statistics	1 Class	2 Class	3 Class	4 Class
Loglikelihood	-93325.37	-84970.99	-83953.58	-83216.89
AIC	186730.73	170071.98	168103.16	166695.77
BIC	186972.15	170464.27	168694.62	167486.40
BIC (sample-size adjusted)	186845.05	170257.74	168383.23	167070.16
Entropy	N/A	0.70	0.75	0.73
Pearson (df)	4328.85 (32638)	4956.80 (32656)	4860.13 (32642)	4764.94 (32640)
P-value	1.00	1.00	1.00	1.00
LMR test	N/A	5792.49	2027.17	1457.02
LMR, p-value	N/A	<0.001	<0.001	0.08
VLMR test	N/A	-87878.16	-84970.99	-83948.14
VLMR, p-value	N/A	<0.001	<0.001	0.08
BLRT test	N/A	-87878.16	-84970.99	-83948.14
BLRT, p-value	N/A	<0.001	<0.001	<0.001

Note. $N = 3088$; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; LMR = Lo–Mendell–Rubin test; BLRT = Bootstrap Likelihood Ratio Test. N/A = not applicable for 1-class solution as there is no other model to compare it to.

Table 2

Probabilities for Most Likely Class Membership by Juvenile Delinquency Risk Factors

Probabilities for Class Membership by Different Latent Class				
	Models			
<u>2-class model</u>	<u>1</u>	<u>2</u>		
1, $n = 1641.78, 0.53$	0.90	0.10		
2, $n = 1446.22, 0.47$	0.08	0.92		
<u>3-class model</u>	<u>1</u>	<u>2</u>	<u>3</u>	
1, $n = 932.30, 0.30$	0.89	0.06	0.05	
2, $n = 998.50, 0.32$	0.05	0.86	0.09	
3, $n = 1157.20, 0.38$	0.04	0.05	0.90	
<u>4-class model</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1, $n = 828.26, 0.27$	0.85	0.08	0.03	0.03
2, $n = 622.52, 0.20$	0.09	0.79	0.08	0.03
3, $n = 877.90, 0.28$	0.03	0.06	0.85	0.06
4, $n = 759.42, 0.25$	0.04	0.02	0.05	0.89

Table 3

Distribution of Gender and Race by Latent Class

Class	Gender	Race					
		<u>African American</u>	<u>%</u>	<u>White</u>	<u>%</u>	<u>Latino</u>	<u>%</u>
Class 1	Male	548	17.75	179	5.80	147	4.76
	Female	38	1.23	14	.45	4	.13
Class 2	Male	459	14.86	259	8.39	206	6.67
	Female	59	1.91	29	.94	26	.84
Class 3	Male	363	11.76	270	8.74	165	5.34
	Female	141	4.57	126	4.08	55	1.78

Note: $N = 3088$. Class 1 = low-functioning, class 2 = high-functioning, class 3 = internalizing.