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The Role of Intellectual and Academic Abilities in Detention Placement among Dually-Diagnosed Juvenile Offenders

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Abstract

This study examined the moderating effects of IQ and academic skills in the relationship between dual diagnosis (i.e., co-occurring psychiatric and substance use disorders) and court-involved, non-incarcerated (CINI) juveniles' detention placement at 12 months post court evaluation. CINI juveniles who underwent a court clinic forensic mental health evaluation (N = 249) completed a battery of assessments targeting demographic information, psychiatric symptoms, and cognitive/academic functioning (i.e., Kaufman Brief Intelligence Test (KBIT-2), Wide Range Achievement Test (WRAT-4)). Previous research demonstrated the predictive ability of co-occurring psychiatric and substance use disorders on CINI juveniles' recidivism (Tolou-Shams et al., 2014). While we expected that lower IQ scores and/or weak academic skills would moderate dually diagnosed juveniles' risk of detention, we only found a weak impact for low math computation abilities. These data have important implications for school- or community-based preventative and interventional programs to offset legal involvement and its associated consequences for at-risk youth.

Introduction

There are currently more than 31 million adolescents under the juvenile courts' jurisdiction, with approximately 1.3 million youths being arrested annually (Puzzanchera 2014; Hockenberry & Puzzanchera, 2014). These youth tend to experience increased rates of negative outcomes such as academic and behavioral problems, risky sexual behavior, substance use, and psychological distress. These undesirable outcomes are associated with repeated legal involvement, which in turn, is often related to worsening health and behavioral problems, and further legal entanglements – creating a vicious downward cycle (Tolou-Shams, Rizzo, Conrad, Johnson, Oliveira, & Brown, 2014). Understanding which variables most directly relate to detention placement and recidivism and how they relate to each other can provide useful information for developing and implementing proper screening measures and evidence-based interventions to successfully divert these youths' trajectory of continued adverse legal involvement and associated consequences.

Psychiatric Concerns

Delinquent youths manifest a number of risk factors related to the development of psychiatric disorders and problem behaviors (e.g., abuse, troubled family and neighborhood environments, parental substance abuse, poverty, poor education, etc.) and often lack protective factors to offset these risks (Teplin, Arbam, McClelland, Dulcan, & Mericle, 2002). In fact, recent statistics report that approximately 70 percent of youth involved in the juvenile justice system have a diagnosable mental health disorder, 79 percent of which meet criteria for two or more diagnoses (Teplin et al., 2002; Whitted, Delavega, & Lennon-Dearing, 2013). Teplin et al. (2002)'s epidemiological study of detained youth broke down these statistics, revealing that nearly two thirds of boys and nearly three quarters of girls met diagnostic criteria for one or more

disorders. The authors caution, however, that these statistics may not be indicative of the true prevalence of mental health disorders in the juvenile justice system. Teplin et al. (2002) suggest that their results may actually underestimate the true prevalence, as youth tend to underreport symptoms and impairments, especially when related to disruptive behaviors.

Substance use disorders are among the leading psychiatric disorders exhibited by juvenile offenders. In fact, compared to their non-offending peers, juvenile offenders have five times higher rates of drug use and three times higher rates of substance abuse disorders (Grisso, 2004; Mauricio et al., 2009). Research has demonstrated that drug use and delinquency are closely linked (White, Loeber, Stouthamer-Loeber, & Farrington, 1999; Mauricio et al., 2009). In fact, drug use is strongly associated with youth aggression and violence (Welte, Barnes, Hoffman, Wieczorek, & Zhang, 2005), affiliation with antisocial peers (Dishion, Capaldi, Spracklen, & Li, 1995) and gang involvement (Thornberry, Krohn, Lizotte, & Chard-Wierschem, 1993; Thornberry, Krohn, Lizotte, Smith, & Tobin, 2003). Welte et al. (2005) examined the association between drug and alcohol use and delinquency among New York youth ages 16 to 19. They found that drug use and alcohol involvement predict early engagement in delinquency and prolong delinquent behavior (i.e., delay maturing out of delinquency). In addition, these juveniles committed more offenses during the periods in which they were involved with substances. This risk for persistent reoffending, substance-related recidivism, and self-reported antisocial activity is even greater for juveniles with co-occurring substance use disorders and other psychiatric problems (Tolou-Shams et al., 2014).

Under the 8th and 14th Amendments, juvenile detainees with serious mental health disorders have a constitutional right to receive treatment (Teplin et al., 2002). Receiving proper psychological services improves overall quality of life and helps reduce recidivism. The

National Mental Health Association (2004) reported that regardless of treatment program type or youth background, juveniles who received treatment had recidivism rates 25 percent lower than juveniles who were untreated. Moreover, evidence-based treatment programs further reduced juveniles' recidivism rates between 25 and 80 percent (National Mental Health Association, 2004). While the juvenile justice system is legally required to provide treatment for mental health disorders, treating co-occurring disorders (i.e., more than one alcohol, drug, or mental health (ADM) disorder) proves to be much more complex than treating only one disorder. Unfortunately, the juvenile justice system's mental health services are often too overburdened to provide adequate care causing juveniles' disorders to persist and worsen – ultimately, contributing to the downward spiral of negative social outcomes and further legal entanglements (Teplin et al., 2002; Teplin, Abram, McClelland, & Dulcan, 2003).

No single, uniform treatment approach works for all people (National Mental Health Association, 2004). Therefore, it is important to provide effective treatment and intervention approaches that address the unique needs of each juvenile. The *responsivity principle* from the Risk-Need-Responsivity Model from Andrews and Bonta (2010a; 2010b) advocates that the clinical characteristics, including the learning needs of juveniles, should guide intervention to enhance treatment outcomes. The *responsivity principle* suggests that interventions need to address the offenders' specific characteristics that may affect their response to treatment (e.g., learning style, motivation, mental health). As many juveniles commit minor, non-violent offenses or status offenses, they should be diverted away from the juvenile justice system whenever possible and towards community-based intervention services targeting their specific mental health and behavior needs (National Mental Health Association, 2004).[1]

[1] Refer to National Mental Health Association (2004) for a list of promising practices operating across the country that address mental health, substance abuse, and co-occurring needs of juvenile justice youth.

Cognitive Functioning

Global Intelligence. Over the past few decades, research has indicated an association between intellectual functioning and crime, where low IQ scores are correlated with greater levels of juvenile delinquency (Koolhof, Loeber, Wei, Pardini, & D'Escury, 2007; Loeber et al., 2012). Koolhof et al. (2007) explored whether delinquent boys with low IQ are more at-risk for delinquent charges than delinquents boys with high IQ, using cross-sectional and longitudinal data from the Pittsburgh Youth Study. They found that the number of delinquent charges was significantly higher for the boys with low IQs compared to the boys with high IQs.

The IQs of juvenile delinquents also tend to be significantly different than the IQs of non-delinquents (Wolfgang, Figlio, & Sellin, 1972; West & Farrington, 1973; Hirschi & Hindelang, 1977; Mednick, Kirkegaard-Sorensen, Hutchings, Knop, Rosenberg, & Schulsinger, 1977; Moffitt, Gabrielli, Mednick, & Schulsinger, 1981; White, Moffitt, & Silva, 1989; Lynam, Moffitt, & Stouthamer-Loeber, 1993). For example, Lynam et al. (1993) found that, in a high-risk sample of 12- and 13-year-old boys, delinquents had significantly lower IQs than non-delinquents. More specifically, Guay, Ouimet, and Proulx (2005) found the difference between IQ scores of non-delinquents and those of delinquents and chronic delinquents to be approximately 8 points (0.5 standard deviation) and 17 points (one standard deviation), respectively.

White et al. (1989) posit that low IQ increases vulnerability to delinquency during adolescence. Hirschi and Hindelang (1977) expound upon this notion further in their meta-analysis of IQ and delinquency research. They endorse IQ as an important correlate of delinquency (regardless of race and social class) and suggest that school attachment and performance may help to explain this relationship. Based on their literature review, Hirschi and

Hindelang (1977) suggest that children with low IQs, who are inadequately prepared for success in school, and who are labeled as "bad" by teachers often find their education experience painful and will likely turn to delinquency. Therefore, perhaps differences in cognitive ability may account for the marked difficulties some of these individuals may exhibit not only in anticipating consequences of their actions and understanding the suffering of others, but also in integrating socially (Guay et al., 2005). The resulting difficulties likely increase the risk for engaging in criminal behaviors.

The age-crime curve illustrates the changes in delinquency prevalence rates from childhood to early adulthood. According to this model, delinquency rates in Western populations increase in late childhood, peak in middle to late adolescence, and then decrease into adulthood (Loeber et al., 2012). Loeber et al. (2012) found that low IQ increased the probability of being charged with a crime from adolescence through early adulthood independent of the effects of co-occurring impulsivity. During this time, brain maturation is also occurring (Loeber et al., 2012; Steinberg, Cauffman, Woolard, Graham, & Banich, 2009; Steinberg, 2010). This could explain why some early offenders exhibit improvements in self-control and impulsivity, reducing their risk for continued criminal activity. However, low IQ paired with enduring various risk factors (e.g., poverty, living in a disadvantaged neighborhood, poor child-rearing practices, family discord, etc.) could offset these gains in brain maturation and maintain the risk for criminal behaviors (Loeber et al., 2012; White, Moffitt, & Silva, 1989).

Several recent studies have examined the relationship between IQ and crime rates on a broader, more aggregate level. For example, both McDaniel (2006) and Pesta, McDaniel, and Bertsch (2010) found that a states' overall average IQ scores had a significant, negative association with state-level crime rates, whereby states with lower average IQ scores experienced

higher aggregate crime rates. Bartels, Ryan, Urban, and Glass (2010) took this research further by examining IQ not only in association with aggregate general crime rates, but also in association with several subtypes of crime. Their findings yielded similar results. In addition to demonstrating a significant negative association between IQ and state crime rates, Bartels et al. (2010) found significant negative associations between IQ and the state murder rate, aggravated assault rate, robbery rate, total property crime rate, burglary rate, theft rate, and motor vehicle theft rate. Taken together, these three studies tend to validate an inverse relationship between state-level crime rates and the average IQ of the state's citizens.

While there seems to be a significant association between lower IQs and greater crime rates, many researchers believe the relationship between IQ and criminal activity to be highly complex. One major argument is that additional factors may exist that attenuates the relationship between IQ and crime, yet not negate it entirely (Bartels et al., 2010). A few of the most prevalent factors include race, socioeconomic status, impulsivity, and school performance. Beaver and Wright (2011) sought to account for these risk variables to further enhance our understanding of the relationship between IQ and aggregate crime rates. They examined IQ and crime rates at a county-level while controlling for concentrated disadvantage, a factor computed to indicate relative neighborhood poverty (Sampson, Raudenbush, & Earls, 1997; Beaver & Wright, 2011). Concentrated disadvantage is calculated using several variables known to be strong predictors of crime rates and has been implicated in a number of negative outcomes related to health (Jones & Duncan 1995; Wen, Browning, & Cagney 2003; Yen & Kaplan 1999), education (Mazawi 1999; Yun & Moreno 2006), arrest rates (Parker, Stults, & Rice 2005), and homicide (Kubrin & Weitzerer 2003; MacDonald & Gover 2005). The predictive variables include:

> 1) the proportion of African Americans living in the county, 2) the proportion of female-headed households in the county, 3) the proportion of households with an annual income < $15,000, 4) the proportion of households receiving public assistance, and 5) the unemployment rate. (Beaver & Wright, 2011, p. 23)

Higher concentrated disadvantage scores indicate higher impoverishment. Beaver and Wright (2011) found significant inverse associations between county-level IQ and all crime measures – property crime rate, burglary rate, larceny rate, motor vehicle theft rate, violent crime rate, robbery rate, and aggravated assault rate. Moreover, these associations remained significant even when considering the possible mediating effects of concentrated disadvantage. These results suggest that low IQ's effects on crime are independent from the effects of other known factors associated with crime rates such as race and poverty (Beaver & Wright, 2011; Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 1998).

Academic achievement abilities. Learning disabilities and disorders (LDs) involve problems in various academic areas such as reading, reading comprehension, and mathematics. According to Rucklidge, McLean, and Bateup (2009), LDs are commonly defined as attaining lower than expected scores (i.e., significantly below average) on achievement tests given the individual's age and educational opportunities. LDs are typically associated with depression, loneliness, suicide, and delinquency. In fact, adolescents with LDs typically have more contact with the criminal justice system than their peers (Rucklidge et al., 2009). Delinquent juveniles commonly have significant academic difficulties, especially in relation to conceptualization, information processing, and reading comprehension. According to Wilkerson, Gagnon, Mason-Williams, and Lane (2012), incarcerated youth generally lag approximately four years behind their public school peers on reading measures. In fact, recent research estimates that the rates of

LDs among juvenile delinquents is significantly higher than the rates of LDs among the general school-aged population, approximately 40% and 9.2% respectively (Shelley-Tremblay, O'Brien, & Langhinrichsen-Rohling, 2007; Wilkerson et al., 2012).

According to recent research, youth with reading comprehension LDs appear to be more prone to recidivate. Rucklidge, McLean, and Bateup (2009) examined LDs among incarcerated youth offenders in New Zealand. They found that a majority of these youth (91.67%) had at least one LD and identified poor reading comprehension as predictive of recidivism, independent of other acknowledged risk factors. More specifically, their results demonstrated that greater levels of comprehension difficulties were associated with more serious and more persistent offending. Therefore, proper screening, identification, and treatment for comprehension LDs may help to reduce recidivism rates among delinquent youths.

Implications for educational services. Much like juveniles' right to psychiatric treatment, they have a lawful right to receive free and appropriate education. According to the Individuals with Disabilities Education Act (IDEA), individualized education programs (IEP) must be provided to children who are identified as needing special educational services (Shelley-Tremblay et al., 2007). However, few juvenile justice facilities provide proper assessments or treatments for learning disabilities. In fact, many facilities do not have adequate mechanisms to identify and serve juveniles with LDs or even seek their prior school records (Shelley-Tremblay et al., 2007). While juvenile facilities across the country provide high-quality education programs, many do not account for the possible (and highly likely) LDs of their juveniles. Once again, in order to be in line with the *responsivity principle* and enhance risk reduction outcomes, youths' treatment plans should incorporate their IQ and academic achievement abilities. As there is a strong correlation between low education attainment, low literacy levels, and high

levels of crime and recidivism, providing quality education services focusing on reading literacy may be one way to combat these trends (Drakeford, 2002). In fact, several studies found that recidivism rates were much lower among groups of juveniles given reading remediation interventions than juveniles who did not receive reading remediation interventions (Drakeford, 2002; Shelley-Tremblay et al., 2007; Rucklidge, McLean, & Bateup, 2009).

Providing proper educational programs and services for delinquent youths with LDs has great implications for their future success. Most juveniles who recidivate, recidivate shortly after their release (Drakeford, 2002). Providing juveniles with proper and effective educational services can offset this tendency for recidivism by improving their academic abilities and helping them develop confidence in their ability to achieve goals and become productive members of society (Drakeford, 2002; Wilkerson, 2012). Such gains in juveniles' reading abilities, and subsequently their confidence, may have additional positive outcomes such as instilling a desire to avoid risk-taking, drugs, and violence (Shelley-Tremblay et al., 2007).

Present Study

While there is accumulating literature on mental health problems among adolescents detained in the juvenile justice system, few studies have explored mental health functioning and related factors among court-involved, non-incarcerated (CINI) youths. As CINI juveniles comprise approximately two-thirds of the juvenile justice population and may endure similar risk factors and associated negative outcomes as detained or incarcerated juveniles (Tolou-Shams et al., 2014), it is critical to examine how various risk factors such as substance use, psychiatric problems, low IQ, and/or deficient academic skills impact CINI youth placement in detention .

Furthermore, while there appears to be substantial evidence that LDs are associated with (and perhaps involved in) juvenile delinquency, little research has focused on how to best

address the needs of learning disabled, delinquent youths – particularly those who are not incarcerated. In fact, in the early 2000s, both the Office of Juvenile Justice and Delinquency Prevention and the United States Department of Education noted that there is a lack of knowledge about children and adolescents with disabilities in the juvenile justice system (National Council on Disability, 2003; Shelley-Tremblay et al., 2007). Specifically, while there is substantial research on learning disabilities among incarcerated juveniles, research has provided us little information on learning disabilities among juveniles involved in other parts of the juvenile justice system (Shelley-Tremblay et al., 2007).

The present study was an extension of the work completed by Tolou-Shams et al. (2014) who found that dual diagnosis (i.e., co-occurring psychiatric and substance use disorders) significantly predicts detention among CINI juveniles. Our study re-examined this relationship between dual diagnosis and detention while controlling for other variables known to be associated with detention placement (e.g., age, gender, race and ethnicity, presence of externalizing behavior, and previous offense). Moreover, we examined the moderating effects of IQ and various academic skills (i.e., reading, comprehension, spelling, and math) in the relationship between dual diagnosis and detention placement. Based on previous research, it was expected that lower IQ scores and/or weak academic skills (i.e., impairments in reading comprehension, math computation, etc.) will moderate dually-diagnosed juveniles' risk of being placed in detention.

Method

Participants

We received a de-identified dataset from Tolou-Shams et al. (2014) for use in this study. The present study was a retrospective chart review of 249 juvenile offenders (149 males, 100

females) who were court-ordered to receive a forensic mental health evaluation at a juvenile court clinic in the Northeast. The adolescents ranged in age from 10 to 18 years (M = 14.61, SD = 1.5) and varied in race and ethnicity. The majority of adolescents self-identified as white/non-Hispanic (65.1%), with the remainder identifying as African American (7.2%), Hispanic/Latino (16.4%), or other (e.g., Asian Pacific Islander or Native American; 4.4%); 6.8% of the juveniles' records were missing race and ethnicity data.

Adolescents involved with the court clinic were status and delinquent offenders. They were court-ordered to the clinic by presiding judges and magistrates in specialty courts (e.g., truancy, juvenile drug court) and formal delinquency cases (Tolou-Shams et al., 2014). Court clinic evaluations were conducted by licensed mental health professionals (psychologists, psychiatrists, and social workers), typically lasted 3 to 4 hours, and were provided at no expense to the family. These evaluations typically included evidence-based, self-report psychological assessment measures completed by the caregiver and juvenile regarding the juvenile's symptoms and behaviors as well as separate brief forensic interviews with the juvenile and the parent or guardian. Time was also spent obtaining information from relevant record reviews (legal, school, and outside treatment providers) and collateral informants. For more information, refer to Tolou-Shams et al. (2014).

Materials

The original chart review examined a number of different factors but this study only examined those related to demographics, IQ, academic achievement abilities, psychiatric and substance use disorders, and detention placement.

Demographics. Demographic information was collected through a standard intake form completed by a legal guardian(s) before the mental health assessment. The form gathered information about various demographics including age, gender, race, and ethnicity.

Psychiatric diagnoses. Licensed mental health professionals (i.e., psychologists, psychiatrists, and social workers) conducted forensic interviews with the parent/guardian(s) and the adolescent. The interviews explored the number and type of diagnoses and comorbidities, as well as history of out-of-home placement, mental health treatment, and psychiatric hospitalization. Evaluating clinicians made all diagnoses using Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) criteria.

Kaufman Brief Intelligence Test, Second Edition (KBIT-2). The KBIT-2 is a brief, individually administered measure of verbal (crystallized) and nonverbal (fluid reasoning) intelligence for children and adults (ages 4 years, 0 months through 90 years, 11 months) (Bain & Jaspers, 2010). It consists of three subtests: Verbal Knowledge, Riddles, and Matrices. The Verbal Knowledge and Riddles subtests comprise the verbal intelligence score while the Matrices subtest comprises the nonverbal intelligence score. The verbal intelligence score and the nonverbal intelligence score are summed together to create the IQ Composite score. The manual contains tables to provide raw score to standard score conversions, 90% confidence intervals, percentile ranks, descriptive categories, and age equivalents. The KBIT-2 maintains good to excellent reliability (Cronbach's alphas ranging from the .80s to mid-.90s) and validity. Despite this, the test authors suggest using the KBIT-2 as a screening measure for intellectual abilities as part of a more comprehensive assessment rather than solely relying on the test for diagnosis and placement.

Wide Range Achievement Test, Fourth Edition (WRAT-4). The WRAT-4 is a brief achievement test that is often used in determining an individual's learning strengths and weaknesses, ages 5 to adulthood (Dell, Harrold, & Dell, 2008). It measures basic academic skills, such as the ability to read words, comprehend sentences, spell, and compute math problems. The manual provides raw score to standard score conversions based on age- and grade-normative groups, confidence intervals, and percentile ranks. The WRAT-4 has moderate to excellent reliability (Cronbach's alpha ranges from .87 to .98) and validity. However, much like other achievement tests, it is recommended that the WRAT-4 be used in a battery with other academic screening measures, as it is not intended to provide formal identification of learning or cognitive disorders.

Legal history and detention placement. The court clinic obtained the referred juveniles' relevant legal history information from the large statewide court database of all juveniles processed through the family court, the Juvenile Case Management System (JCMS). This information included referral source (e.g., truancy, drug, or delinquency petition), number and type of charges (delinquency versus status), and history of social service involvement. The JCMS database was also used to calculate the main outcome of the study, detention. For the purposes of this study, a detention outcome score (yes or no) was calculated for accruing at least one charge over the 12-month follow-up period that resulted in detention placement.

Procedure

A retrospective chart review was completed by research assistants working for Tolou-Shams et al. (2014). The information was coded and entered into a master database. As previously stated, our study examined a de-identified subgroup (N = 249) of Tolou-Shams et al. (2014)'s master dataset (N = 404) for our analyses. This subset was chosen based on the

availability of cognitive functioning data (i.e., IQ and academic achievement abilities) for the juveniles.

Results

Descriptive Statistics

Before testing the primary hypotheses, various descriptive statistical analyses were conducted for demographics, dual diagnosis, cognitive functioning, and detention.

Demographics. As previously mentioned, 149 boys and 100 girls (N = 249) were court-ordered to receive a forensic mental health evaluation. The ages reported ranged from 10 to 18 years (M = 14.61, SD = 1.5). The juveniles' race and ethnicity varied with 65.1% reporting white/non-Hispanic, 16.4% reporting Hispanic/Latino, 7.2% reporting African American, and 4.4% reporting other (e.g., Asian Pacific Islander or Native American); 6.8% of the juveniles' records were missing race and ethnicity data. The majority of juveniles (79.9%) reported having either private (43%) or public health insurance (36.9%) and 25.3% of juveniles endorsed a current individualized education plan or 504 plan.

Of these juveniles, 75.1% were referred from wayward or truancy petitions, 17.3% were referred from juvenile drug court, and 7.6% were referred from juvenile delinquency court. Approximately 25% of the juveniles had prior delinquent (10%) or status (15.3%) offenses and roughly 38% reported the existence of an externalizing behavioral problem diagnosis. Table 1 compares the frequencies of this demographic data for detained and non-detained juveniles.

Dual Diagnosis. There were less juveniles with co-occurring psychiatric and substance use disorders (19.7%) than those with a single or no diagnosis (61.8%); 46 juveniles had missing data for dual diagnosis. Gender differences for dual diagnosis were examined through a chi-square test of independence. The relationship between these variables was significant, $\chi^2(1, 203)$

= 6.11, p = .01. This indicates that boys and girls significantly differed in their rates of dual diagnosis, where more boys than girls received dual diagnosis (30.7% and 15.7% respectively).

Cognitive functioning. As a whole, juveniles' scores on the three components of the KBIT-2 (i.e., Verbal Standard Score, Nonverbal Standard Score, and IQ Composite) fell within the average range (see Table 2). Scores falling between 85 and 115 are considered average for the KBIT-2. The juveniles' academic ability scores also mainly fell within the average range. Specifically, juveniles' scores on the Word Reading, Sentence Comprehension, Reading Composite, and Spelling components of the WRAT-4 were average; however, their scores on the Math Computation component were below average (see Table 2). On the WRAT-4, scores falling between 90 and 109 are considered average and scores between 80 and 89 are considered below average.

Gender differences in cognitive functioning were examined through an independent t-test; data described in Table 3. While boys scored slightly higher on Verbal Standard Score (M = 91.67, SD = 11.72), IQ Composite (M = 92.29, SD = 13.23), and Word Reading (M = 97.56, SD = 13.86) than girls (M = 90.50, 91.63, and 96.88 respectively, SD = 11.88, 12.05, and 12.98 respectively), girls scored slightly higher on Sentence Comprehension (M = 94.59, SD = 11.85) and Spelling (M = 97.99, SD = 10.07) than boys (M = 92.22 and 95.17 respectively, SD = 12.49 and 15.59 respectively). None of these gender differences were statistically significant. Boys and girls also did not differ in their scores on Nonverbal Standard Score, Reading Composite, and Math Computation.

Detention Placement. As a whole, there were less juveniles who were detained during the 12 month follow-up (17.3%) than those who were not detained (82.7%). A Chi-Square Test of Independence was performed to examine the relationship between gender and detention. The

relationship between these variables was significant, $\chi^2(1, 249) = 6.18$, $p = .01$. This indicates that boys and girls significantly differed in their rates of detention, where more boys than girls were detained (22.1% and 10% respectively).

Relationship between Dual Diagnosis and Detention Placement

As previously mentioned, the present study sought to extend Tolou-Shams et al. (2014) study that found a predictive relationship between dual diagnosis and detention. In order to contribute additional information to the literature regarding the influence of dual diagnosis on delinquent behavior and to create a foundation for our analyses, we mirrored Tolou-Shams et al. (2014) analyses of these variables. First, Pearson Correlation Coefficients were calculated. There was a moderate, positive correlation between dual diagnosis and detention, r (203) = .37, $p < .01$. These results suggest that those with dual diagnosis tend to be at-risk for detention.

Second, in order to ascertain the effects of dual diagnosis on the likelihood that CINI juveniles will be detained at 12 months post court intake evaluation, a logistic regression was performed. The model included other variables known to relate to detention including age, gender, race/ethnicity, presence of externalizing behavior problems, and previous offense. The logistic regression model was statistically significant, $\chi^2(7, 193) = 35.64$, $p < .001$. Table 4 reflects the odds ratio of this association. The model correctly classified 80.8% of cases and explained approximately 26.6% (Nagelkerke R^2) of the variance in detention (see Table 5). The Wald criterion demonstrated that both comorbidity and prior status offenses made significant contributions to prediction of detention ($p < .001$ and $p < .05$, respectively). The odds ratios indicated that the odds of detention increases 5.52 times for juveniles with dual diagnosis (i.e., co-occurring psychiatric and substance use disorders) and 2.89 times for juveniles with prior status offenses.

Moderated Logistic Regressions

The present study examined the moderating effects of IQ and academic abilities on the predictive relationship between dual diagnosis and detention placement. In order to examine these relationships, two moderated logistic regressions were conducted. The first logistic regression model examined IQ. Figure 1 illustrates its theoretical moderation model. This model's predictor variables included dual diagnosis, IQ, and the interaction term involving dual diagnosis and IQ, as well as the same variables previously included that are known to be associated with recidivism and detention (i.e., age, gender, race/ethnicity, presence of externalizing behavior problems, and previous offense).

The moderated logistic regression model was statistically significant, $\chi^2(9, 192) = 36.96$, $p < .001$. Table 6 reflects the odds ratio of these associations. The model correctly classified 80.2% of cases and explained 27.5% (Nagelkerke R^2) of the variance in detention (see Table 7). IQ did not significantly contribute to the prediction model. Once again, prior status offense and dual diagnosis were the only significant predictors of detention ($p < .05$ and $p < .001$ respectively).

The second logistic regression model examined academic achievement abilities. Figure 2 illustrates its theoretical moderation model. This model's predictor variables included age, gender, race/ethnicity, presence of externalizing behavior problems, previous offense, dual diagnosis, academic achievement variables, and interaction terms involving dual diagnosis and academic achievement variables. Specifically, these interaction variables were: Reading Composite*Dual Diagnosis, Spelling*Dual Diagnosis, and Math Computation*Dual Diagnosis.

The moderated logistic regression model was statistically significant, $\chi^2(13, 165) = 40.85$, $p < .001$. Table 8 reflects the odds ratio of these associations. The model correctly classified 85.5% of cases and explained 34.7% (Nagelkerke R^2) of the variance in detention (see Table 9). The significant predictors of detention placement were dual diagnosis ($p < .01$), math computation ($p < .05$), and the interaction term, Math*Dual Diagnosis ($p < .05$). These results indicate that the odds of detention increases 5.73 times for juveniles with dual diagnosis and decreases 1.23 times for every unit of increase in math score. However, for dually-diagnosed juveniles, the odds of detention increases 1.15 times with every unit of decrease in math score.

Exploratory Analyses

In order to determine whether there was another variable impacting the unexpected math scores, exploratory analyses were conducted examining various factors such as ethnicity, gender, and referral source. Ethnicity and gender did not significantly contribute to the model predicting detention; however, referral source did. The moderated logistic regression was statistically significant, $\chi^2(10, 176) = 47.80$, $p < .001$. Table 11 reflects the odds ratio of these associations. The model correctly classified 86.4% of cases and explained 38.4% (Nagelkerke R^2) of the variance in detention (see Table 12). The interaction term, Math*Referral Source, was the only significant predictor of detention (odds ratio = .98). These results suggest that there was an inverse relationship between referral source, dual diagnosis, and detention rates. The odds of detention increases 1.02 times for dually-diagnosed juveniles involved in truancy court.

In order to determine if truancy weighted the mean math scores, we examined the distribution of truancy among our groupings (see Table 13). As Figure 4 illustrates, mean math scores for truant juveniles were lower overall. Similarly, mean math scores for detained juveniles also tended to be lower, except for juveniles referred from non-truancy sites (e.g.,

delinquency court, drug court, etc.). Based on these score distributions among truant vs. non-truant juveniles, truancy could be a factor in decreasing mean math score. Once again, however, inferences from this data should be made cautiously due to the unequal distribution of the sample in each group.

Discussion

As an extension of the work completed by Tolou-Shams et al. (2014), the purpose of the present study was to examine whether IQ and various academic skills (i.e., reading comprehension, spelling, and math) moderated the relationship between dual diagnosis (i.e., co-occurring psychiatric and substance use disorders) and CINI juveniles' detention at 12 months post court evaluation. It was predicted that lower IQ scores and/or weak academic skills (i.e., impairments in reading comprehension, math computation, etc.) would moderate dually-diagnosed juveniles' chances of detention. Overall, the results provided mixed support for the primary hypothesis and raised important implications for effectively addressing juvenile dual diagnosis and providing proper educational supports for students struggling in the classroom.

After conducting a series of multiple regressions, we found that dual diagnosis, prior status offenses, weak math computation skills, and truancy court referrals were the most significant predictors of CINI juvenile detention placement. While dual diagnosis has been established as a major risk factor for detention, added disadvantages such as math computation weakness or truancy from school can exacerbate juveniles' risk for detention. The current results need to be interpreted with caution, however, since there were vastly unequal distributions (*N*) in the various groups (i.e., dual diagnosis, no dual diagnosis, detention, no detention). In addition, it is possible that there was a selection bias in referral source, with truancy court judges referring vastly more juveniles to the court clinic for educational testing and evaluation than judges from

other referral sites (i.e., drug court, delinquency court). These differences could be due to the inherent nature of truancy court. Truancy court judges work closely with the juveniles' cases and seek to target and overcome the underlying causes of truancy (e.g., school or academic issues, mental health issues, family and community issues, etc.). Therefore, these judges may be more likely to notice educational difficulties and, subsequently, refer juveniles for assessment and services.

Psychiatric Concerns

Overall, most of the juveniles in the current sample did not have a dual diagnosis nor were detained within 12 months of their court evaluation. However, those juveniles who did have a dual diagnosis had a heightened risk of future detention. This relationship remained significant even after accounting for various demographic variables commonly linked with reoffending and detention such as age, gender (although significantly more boys than girls were detained), race and ethnicity, presence of externalizing behavior problems, and prior status offenses. This increased risk of committing another offense resulting in detention may be due to the substance use (severe enough to warrant an abuse or dependency diagnosis) that co-occurs with an Axis I psychiatric disorder (Tolou-Shams et al, 2014).

As Tolou-Shams et al. (2014) noted, these results have tremendous implications for the juvenile justice system. Implementing a screening policy for substance use and other psychiatric concerns at the juvenile's first court contact would enable court clinicians to determine the juvenile's and his/her family's specific problems and provide early, appropriate treatment referrals. Targeting these needs in a timely fashion can not only help offset repeat legal involvement and its associated negative outcomes (particularly related to substance use), but also result in more efficient use of mental health, legal, school, and health system resources.

Cognitive Functioning

Unlike most of the literature on juvenile offenders, the current juveniles had IQ and academic achievement scores that fell largely within the average range, with only math computation scores falling below average. This difference may be explained by the fact that most research on juvenile offenders focuses on incarcerated juveniles while the present study focused on non-incarcerated juveniles. This could suggest that juveniles who do not commit serious enough offenses to result in incarceration have greater IQ and cognitive abilities overall.

Math computation. While our sample of CINI juveniles had average cognitive abilities overall, their math computation abilities fell below average. It should be noted that math computation was also the only IQ or academic variable to significantly contribute to the prediction of juvenile detention. The significant interaction between dual diagnosis and math computation abilities in the prediction of detention engenders numerous questions about this relationship that need to be examined in future research. For example, was this interaction between dual diagnosis and math computation abilities significant due to inherent cognitive processes involved with mathematics or could it be due to the weakness itself? It could be that any type of vulnerability (e.g., below average IQ, reading comprehension, etc.) could contribute to delinquent behavior and subsequent involvement in the juvenile justice system. Furthermore, it is also important to determine whether the impact of academic vulnerability (particularly math computation abilities in this study) is actually due to deficits in specific cognitive processes or whether it is due to another underlying variable (e.g., socialization problems).

Hirschi's (1969) social control theory posits that intelligence, academic ability, and school performance directly relate to delinquency and that their effects are independent of other causal factors such as age, gender, and socioeconomic status (Moffit et al., 1981; White et al.,

1989). Youth with average or high cognitive ability are more likely to experience rewards in school for their strong performance and, therefore, find fulfillment and enjoyment in that arena (Short & Strodtbeck, 1965; Rhodes & Reiss, 1969; West & Farrington, 1973; Hirschi & Hindelang, 1977; Mednick et al., 1977; Moffit et al., 1981). Youth with low cognitive ability and poor school performance, however, are more likely to experience frustration, failure, and poor self-esteem, limiting the rewards they receive in school and leading to an overall negative experience (Moffit et al., 1981; White et al., 1989).

These experiences of educational failure, ridicule, and neglect can ultimately lead to delinquent and antisocial behavior by creating negative attitudes toward authority and making children more susceptible to the effects of peer pressure, as peers provide an important source of esteem and social reward (Moffit et al., 1981; Finn, Stott, & Zarichny, 1988; Brier, 1993; Shelley-Tremblay et al., 2007). In fact, many individuals with learning disabilities and low self-esteem report seeking acceptance and rewards by joining gangs or engaging in illegal activities (e.g., drug use) (Drakeford, 2002). Therefore, it seems as though a combination of academic problems, characteristics of the school environment (i.e., supportive vs. unsupportive teachers), social relationships established in school, and youths' perceptions of their educational opportunities, may have a direct bearing on delinquent behavior and involvement in the juvenile justice system (Shelley-Tremblay et al., 2007).

The social control theory could help to explain the influence of math computation on the relationship between the juveniles' dual diagnosis and detention. The current sample of juveniles demonstrated average abilities in all IQ and academic achievement variables except for math computation. The juveniles' strengths in these other arenas may have acted as a protective factor to the possible failure and frustration caused by their math weakness. This could have

reduced the magnitude of their original offenses, separating these CINI juveniles from their incarcerated peers.

Impact of truancy. Of the juveniles in the current sample, juveniles referred from truancy court had the lowest mean math scores. As previously discussed, the social control theory posits that youth with poor academic performance tend to endure a negative overall experience in school. This relationship can generate a downhill spiral of negative outcomes – poor attendance (i.e., truancy), increase in problem behaviors, dropping out of school, incarceration, and recidivism (Wilkerson et al., 2012). Truancy can be considered not only a delinquent behavior in and of itself, but also a precursor to further delinquency. Poor school attendance directly impacts the youth's academic performance, exacerbating the negative education experience (i.e., failure, frustration, low self-esteem). Furthermore, by not attending school, youth have more free time to engage in other delinquent activities. Therefore, it seems as though unaddressed academic vulnerabilities can put youth at risk for truant behavior, which can spiral into serious and longstanding effects on juveniles' ability to successfully complete school and integrate into the community (Keith & McCray, 2002; Vanderstaay, 2006; Wilkerson et al., 2012; Rucklidge et al., 2013).

Limitations

As Tolou-Shams et al. (2014) previously outlined, the methodology employed in the study boasts a number of strengths. Despite notable strengths such as reviewing a large sample size and collecting detention data through a statewide court database which ensures greater outcome accuracy than self-report methods, our study has several limitations. Future studies should be performed to replicate and further validate the findings reported here. These studies should be conducted in court clinic settings and incorporate prospective methods.

As this study was a retrospective chart review and the data were not collected specifically for research purposes, several inherent challenges for data collection and generalizability arose in spite of rigorous chart review procedures. First and foremost, evaluation measures were chosen depending on clinical need, resulting in missing data among the adolescents. For example, due to inconsistencies in the court clinic's administration of the KBIT-2 and WRAT-4 assessments, we used a reduced sample in order to control for these data gaps. This not only greatly reduced our overall sample size, but also greatly affected the sample distributions among the subgroups (e.g., detention vs. no detention, dual diagnosis vs. no dual diagnosis, etc.).

Generalizability was also limited as data was only collected from one juvenile justice court clinic in the northeastern United States. Other juvenile justice jurisdictions may have vast differences in the demographics (e.g., age, gender, race, ethnicity, socioeconomic status, etc.) and psychological concerns of their adolescents compared to the current jurisdiction. In addition, the juveniles court-ordered to the study clinic may not even reflect the larger juvenile justice population in the immediate area, as these adolescents raised additional concerns from the judge related to more evident emotional, behavioral, and psychological concerns (Tolou-Shams et al., 2014).

Concluding Remarks and Future Directions

Despite its limitations, our study has several implications for the juvenile justice system and its youth. The juvenile justice system has a high frequency of learning difficulties (Shelley-Tremblay et al., 2007). As discussed, academic weaknesses can be associated with increased behavior problems, involvement in antisocial behavior, and delinquency. These issues not only directly affect the child and his or her family, but also indirectly causes serious clinical and social problems (e.g., monetary costs associated with juvenile justice involvement and mental

health treatment, potential gang activity, increased youth drug use, etc.) (Rucklidge et al, 2013). Therefore, there is a great need for preventative efforts to identify youth at risk for delinquency (e.g., dual diagnosis, poor academic performance and lack of school attachment, etc.) and to better understand how to effectively intervene to offset these youths' risk factors.

While the current study generated thought-provoking results that have great implications for juvenile mental health and the juvenile justice system, the field needs to continue this line of research to further our understanding of the risks associated with CINI juvenile offending. Future research should consider focusing more specifically on the social control theory by incorporating various measures to examine juveniles' self-esteem and attitudes towards school. If possible, these studies should also incorporate more comprehensive neuropsychological assessments to examine brain function to determine whether academic vulnerabilities are due more to factors associated with neuropsychological problems such as executive functioning deficits. This research could inform intervention and prevention programs to offset CINI juveniles' risk of offending (e.g., early detection of academic weaknesses and implementation of support system to neutralize these weaknesses; increase youth attachment to school early in academic career). CINI juveniles comprise a large portion of the juvenile justice population and endure many of the same risk factors and associated negative outcomes as detained or incarcerated juveniles (Tolou-Shams et al., 2014). Therefore, more research on this specific juvenile justice population is critical.

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Table 1

Frequencies of Demographic Data for Detained vs. Non-Detained Juveniles

Type	**Subgroup**	**No Detention (*N* = 206)**	**Detention (*N* = 43)**	**Total**
Gender	Male	116	33	149
	Female	90	10	100
Race/Ethnicity	White	134	28	162
	African American	10	8	18
	Hispanic/Latino	36	5	41
	Other*	19	0	19
Dual Diagnosis	Absent	137	17	154
	Present	27	22	49
Referral Source	Delinquency	14	5	19
	Truancy Court	171	16	187
	Drug Court	21	22	43
Health Insurance	Uninsured	24	4	28
	Public	77	15	92
	Private	86	21	107
IEP/504 Plan	No	100	22	122
	Yes	50	13	63
Prior Delinquent Offense	No	183	31	214
	Yes	13	12	25
Prior Status Offense	No	173	31	204
	Yes	26	12	38
Externalizing Behavior Diagnosis	Absent	129	26	155
	Present	77	17	94

Note: total *N* = 249; *comprised of American Indian, Asian/Pacific Islander, and 'Other'

Table 2

Overall Descriptive Statistics for Cognitive Functioning

Type	Name	Mean	Std. Deviation	N
IQ	Verbal Standard Score	91.20	11.77	248
	Nonverbal Standard Score	94.79	13.80	248
	IQ Composite	92.02	12.74	248
Academic Abilities	Word Reading	97.29	13.49	228
	Sentence Comprehension	93.16	12.86	226
	Reading Composite	94.34	12.33	225
	Spelling	96.32	13.65	218
	Math Computation	88.44	11.28	225

Note: differences in N due to inconsistencies in assessment administration

Table 3

Gender Descriptive Statistics for Cognitive Functioning

Type	Name	Mean		Std. Deviation		N	
		Male	**Female**	**Male**	**Female**	**Male**	**Female**
IQ	Verbal	91.67	90.50	11.72	11.88	148	100
	Nonverbal	94.78	94.81	14.86	12.14	148	100
	IQ Composite	92.29	91.63	13.23	12.05	148	100
Academic Abilities	Word Reading	97.56	96.88	13.86	12.98	136	92
	Sentence Comprehension	92.22	94.59	13.49	11.85	136	90
	Reading Composite	94.01	94.83	12.51	12.12	135	90
	Spelling	95.17	97.99	15.59	10.07	129	89
	Math Computation	88.23	88.77	11.55	10.93	135	90

Note: differences in N due to inconsistencies in assessment administration

Table 4

Summary of Logistic Regression Analysis Predicting Detention with Demographic, Mental Health, and Prior Offending Variables

Predictor	**β**	**SE**	**Exp(β)**	**Wald Statistic**
Age	.03	.16	1.03	.03
Gender	.69	.44	1.99	2.45
Ethnicity	.001	.001	1.00	1.04
Prior Delinquent Offense	.79	.56	2.21	1.99
Prior Status Offense	1.06	.49	2.89	4.73*
Externalizing Behaviors	-.39	.42	.67	.89
Dual Diagnosis	1.71	.46	5.52	13.65**

*$p < .05$, **$p < .001$

Table 5

Classification Table for Demographic, Mental Health, and Prior Offending Variables

		Detention Predicted		Percentage Correct
		No	**Yes**	
Detention Observed	**No**	148	6	96.1
	Yes	31	8	20.5
Overall Percentage				80.8

Table 6

Summary of Logistic Regression Analysis Predicting Detention with Intellectual Functioning as a Moderating Variable

Predictor	**β**	**SE**	**Exp(β)**	**Wald Statistic**
Age	.03	.16	1.03	.03
Gender	.72	.44	2.05	2.63
Ethnicity	.001	.001	1.00	1.06
Prior Delinquent Offense	.79	.57	2.21	1.95
Prior Status Offense	1.06	.49	2.89	4.66*
Externalizing Behaviors	-.45	.43	.64	1.09
Dual Diagnosis	1.74	.47	5.68	13.75**
IQ Composite	-.04	.05	.96	.48
IQ*Dual Diagnosis	.02	.04	1.02	.35

*$p < .05$, ** $p < .001$

Table 7

Classification Table for Intellectual Functioning as a Moderating Variable

		Detention Predicted		Percentage Correct
		No	**Yes**	
Detention Observed	**No**	146	7	95.4
	Yes	31	8	20.5
Overall Percentage				80.2

Table 8

Summary of Logistic Regression Analysis Predicting Detention with Academic Achievement Abilities as Moderating Variables

Predictor	**β**	**SE**	**Exp(β)**	**Wald Statistic**
Age	-.14	.18	.87	.61
Gender	.96	.53	2.60	3.23
Ethnicity	.001	.001	1.00	1.74
Prior Delinquent Offense	1.00	.65	2.72	2.35
Prior Status Offense	.81	.59	2.24	1.87
Externalizing Behaviors	-.67	.49	.51	1.83
Dual Diagnosis	1.75	.59	5.73	8.53*
Spelling	-.04	.10	.96	.13
Math	-.21	.10	.81	4.37**
Reading	.12	.12	1.13	1.00
Spelling*Dual Diagnosis	.08	.08	1.08	1.04
Math*Dual Diagnosis	.14	.07	1.15	4.59**
Reading*Dual Diagnosis	-.15	.09	.86	2.51

*$p < .01$, ** $p < .05$

Table 9

Classification Table for Academic Achievement Abilities as Moderating Variables

		Detention Predicted		Percentage Correct
		No	**Yes**	
Detention Observed	**No**	126	6	95.5
	Yes	18	15	45.5
Overall Percentage				85.5

Table 10

Summary of Mean Math Scores

		Dual Diagnosis	
		No	**Yes**
Detention	**No**	88.50 (*N* = 129)	90.21 (*N* = 24)
	Yes	84.14 (*N* = 14)	91.47 (*N* = 19)

Note: *GN* = 186; *GM* = 88.44

Table 11

Summary of Logistic Regression Analysis Predicting Detention with Referral Source as a Moderating Variable of Math Abilities

Predictor	**B**	**SE**	**Exp(β)**	**Wald Statistic**
Age	-.33	.19	.72	3.02
Gender	.33	.56	1.39	.35
Ethnicity	.001	.001	1.00	.46
Prior Delinquent Offense	.43	.65	1.54	.44
Prior Status Offense	.76	.58	2.13	1.73
Externalizing Behaviors	-.13	.49	.88	.07
Dual Diagnosis	-1.63	3.77	.19	.19
Math	-.08	.07	.93	1.08
Math*Dual Diagnosis	.04	.04	1.04	.92
Math*Referral Source	-.02	.006	.98	12.43*

*$p < .001$

Table 12

Classification Table for Referral Source as a Moderating Variable of Math Abilities

		Detention Predicted		Percentage Correct
		No	**Yes**	
Detention Observed	No	136	7	95.1
	Yes	17	16	48.5
Overall Percentage				86.4

Table 13

Summary of Mean Math Scores: Frequencies of Truancy Referrals

		Dual Diagnosis	
		No	**Yes**
Detention	**No**	88.50 (*N* = 129, *n* = 109)	90.21 (*N* = 24, *n* = 19)
	Yes	84.14 (*N* = 14, *n* = 9)	91.47 (*N* = 19, *n* = 3)

Note: *GN* = 186; *GM* = 88.44; *N* denotes total number of juveniles; *n* denotes number of juveniles who were referred from truancy court

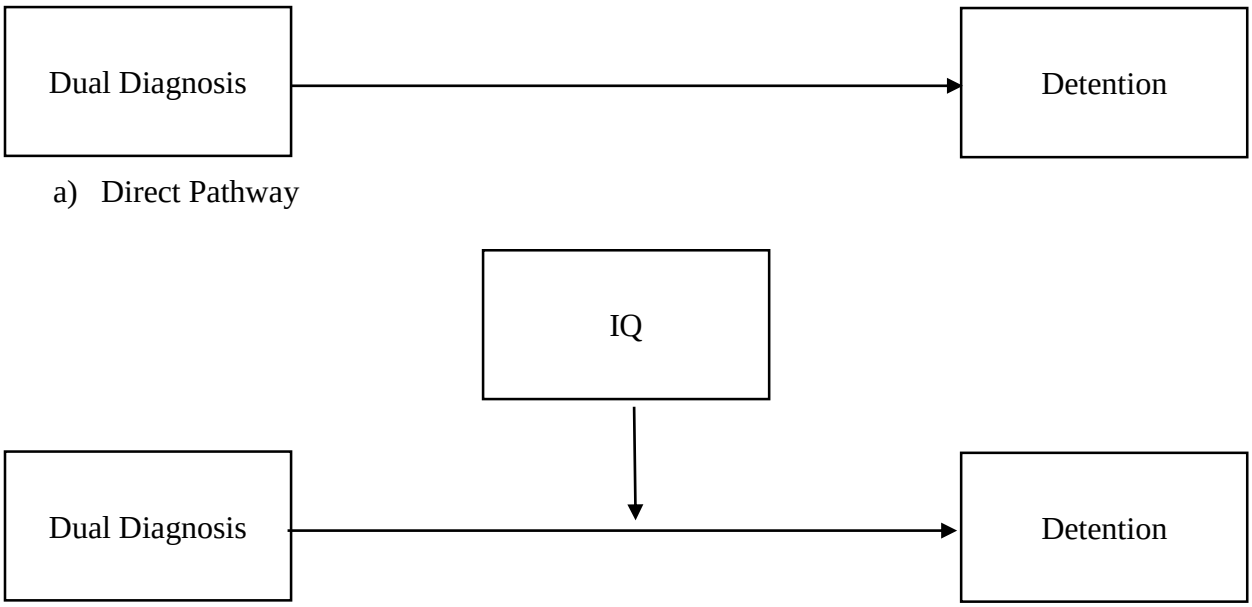

Figure 1. Theoretical moderation model of IQ.

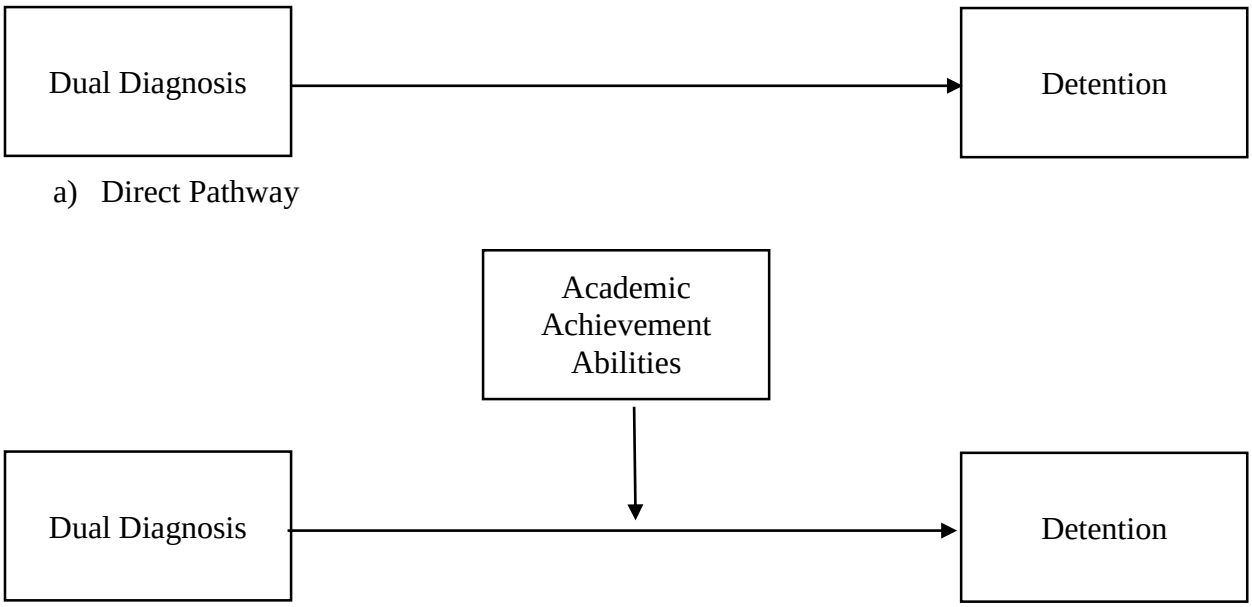

Figure 2. Theoretical moderation model of academic achievement abilities.

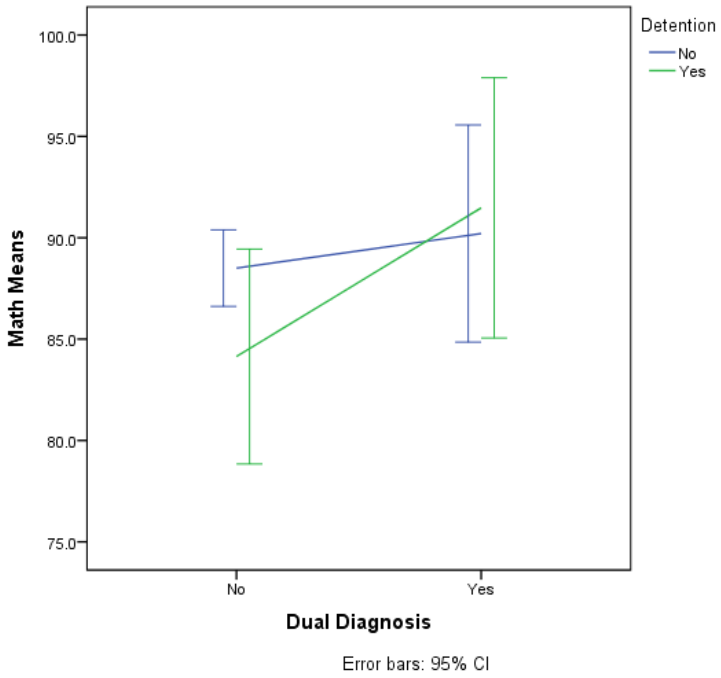

Figure 3. Comparing math means for dual diagnosis by detention.

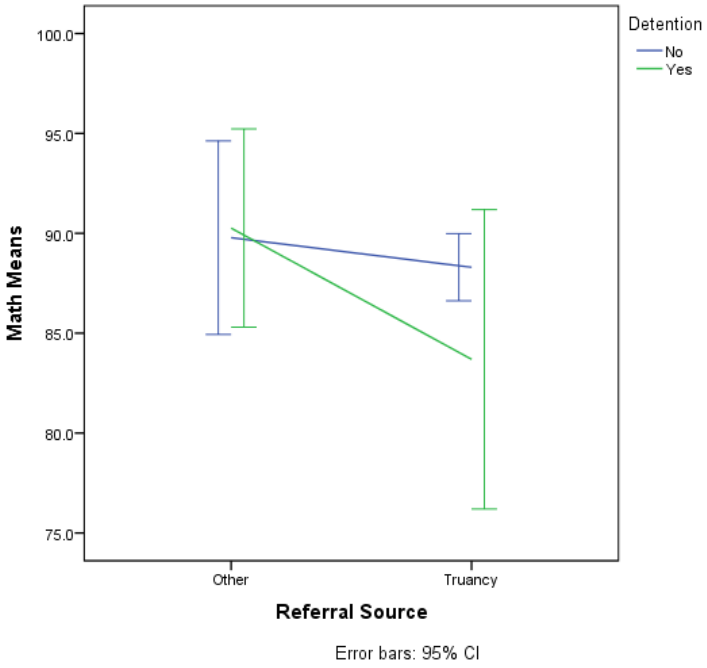

Figure 4. Comparing math means for referral source by detention.