ABSTRACT

The purpose of this study was to determine predictive capabilities of The Reynolds Intellectual Screening Test (RIST; Reynolds and Kamphaus, 2003) and age at time of psychological evaluation in determining whether juveniles will reoffend in 24-months. The RIST is comprised of two subtests of The Reynolds Intellectual Assessment Scales (RIAS; Reynolds and Kamphaus, 2003) assessment and can be used as a screening tool for intellectual impairment. Data from 202 youth offenders were included in the current study after being court-referred for psychological evaluation. Test of discriminant function was conducted. These findings suggest that the RIST, in combination with age, may show promise as an efficient screener for youth at lower risk of recidivism. Limitations and directions for further research are discussed.

INDEX WORDS: RIAS, RIST, Intelligence, Q-Factor, Juvenile Offenders, Juvenile Delinquency, Adolescent, Psychological Evaluation, Psychological Screening, Age
SCREENING FOR RECIDIVISM

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To my parents, Robert and Theresa Carr, for their unconditional love and support.
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This marks the end of a journey that could not have been completed without the contributions and encouragement from my family and faculty.

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CHAPTER 1

INTRODUCTION

Juvenile justice policy in the United States has evolved since the first juvenile court was established in Chicago in 1899. In the past fifteen years, substantial changes have been made to reform the juvenile justice system to implement a more equitable judicial process and favor youth rehabilitation rather than punishment (Council, 2013). Today, the juvenile justice system finds itself at a unique crossroad between the need to ensure best practices in rehabilitation of juvenile offenders and protection of the public (Lopez & Russell, 2008). Despite these changes, research continues to lag behind resulting in a system limited in its effectiveness whereby economically disadvantaged and minority youth are often disproportionately affected by judicial services (Nellis & Richardson, 2010).

The U.S. society has long debated and struggled with the concept of juvenile delinquency and effective ways to monitor and regulate this negative behavior (Grisso, Vincent, and Seagrave, 2005). A 2014 analysis of Georgia’s 1994 School Safety and Juvenile Justice Reform Act (SB440), legislation intended to impose stricter sentencing for the most violent criminal acts by youths 13 to 16 years old who were charged with one of the “Seven Deadly Sins” (i.e. murder, armed robbery with a firearm, rape, voluntary manslaughter, aggravated sexual battery, aggravated sodomy and aggravated child molestation) by establishing exclusive jurisdiction to the adult court system to prosecute and sentence those offenders, found that harsher penalties did little to deter repeat offenders. The study’s findings showed that felony recidivism rates were essentially the
same whether held under jurisdiction of the juvenile system or its adult prison system (Walls, 2014).

A renewed focus on rehabilitation has shifted the judicial paradigm toward supporting youth diversion away from the justice system. Newer legislation in the state is intended to move non-violent juvenile offenders out of secure detention into evidenced-based therapeutic programs based in their communities effectively reducing recidivism and potentially saving the state over $70,000 a year per youth (Walls, 2014). The significant costs associated with juvenile delinquency, both to the individual as well as to society as a whole, have raised awareness of politicians and law-enforcement leaders to focus on improved assessment and decision making tools to determine appropriate treatment recommendations for juvenile offenders.

Research on juvenile delinquency has demonstrated that primary risk factors include poor parental supervision, punitive or erratic parental discipline, cold parental attitude, child physical abuse, parental conflict, disrupted families, antisocial parents, large family size, low family income, impulsiveness, low IQ and low school achievement, high delinquency rate schools, antisocial peers, and high crime neighborhoods (Murray and Farrington, 2010). Therefore, as articulated by Calhoun, Glaser, & Bartolomucci, (2001), it is important that delinquent behaviors be viewed through a multidimensional and multi-causal paradigm that takes into consideration variables associated with (1) the characteristics of the child (e.g., personality factors, genetic predispositions, gender, life skills/social competence, and cognitive processing factors), (2) the ecological contexts within which the child lives (e.g., the family, neighborhood, peers, school, and community), and (3) the interactions among these variables. Effective programming and treatment designed to rehabilitate juvenile offenders requires
efficient and efficacious assessment of these principal factors in order to inform judicial
decision making and appropriate service referrals.

A social justice perspective encourages psychologists to function as change agents at
the organizational, institutional, and societal levels to address issues of equity and social
responsibility (Ridley et al., 1994; Toporek & Reza, 2001; Bell, 2007). As culturally-
sensitive practices and social justice advocacy are two foundational aspects of professional
identity of Counseling Psychologists, psychological assessment with juvenile offenders
provides a rich opportunity to embody those espoused values. Since the existence of
institutionalized discrimination is what often accounts for the inequitable experiences of
people of marginalized and vulnerable groups in the United States, it is important for
psychologists to ensure assessments are appropriate for use with those populations and
minimize bias in evaluations when possible (Vera and Speight, 2003). Psychologists are
encouraged to stay vigilant to ways in which bias and discrimination can manifest in the justice
system and their own work to work to correct those injustices at the micro-, meso-, and macro-
levels.

Extant literature has repeatedly indicated a correlational relationship between offender’s
level of cognitive functioning and juvenile delinquency. These findings are also most
pronounced when youth also present with higher nonverbal abilities than verbal abilities
(Koolhoof et. al., 2007; Lynam et. al., 1993; Moffitt and Silva, 1988). While these findings are
often in the form of weak predictors of delinquency, their presence presents an opportunity for
psychologists to intervene in the justice system and provide an important service.
Statement of the Problem

Research assessing cognitive functioning within the juvenile offender population has most often been conducted using the various iterations of the Wechsler Intelligence Scales for Children (WISC) or the Wechsler Adult Intelligence Scales (WAIS) (Wechsler, 1949, 1955; respectively). However, outside of academic-supported research programs, the juvenile justice system often lacks critical resources with regard to time, finances, and trained clinicians to provide thorough assessment services. As assessment protocols continue to grow longer in number of questions, favoring psychometrics over efficiency, the number of youth unable to receive psychological assessment continues to grow with it. Brief intelligence screeners may prove invaluable in identifying youth at higher risk for recidivism and facilitate referral to appropriate resources for more thorough assessment.

The Reynolds Intellectual Assessment Scales (RIAS; Reynolds and Kamphaus, 2003) is a convenient, brief assessment instrument. The Reynolds Intellectual Screening Test (RIST; Reynolds and Kamphaus, 2003) is comprised of two subtests of the full RIAS assessment, can be used as a screening tool for intellectual impairment. The RIAS/RIST may serve as useful cognitive assessment instruments for working with the juvenile offender population. Both the RIAS and RIST have several benefits that make it attractive for use with this demographic, including (1) the limited time required for administration and scoring, (2) the ability to assess a wide age range, (3) low costs, and (4) sound psychometric properties (Reynolds and Kamphaus, 2003; Elliot, 2004). However, research on the use of the RIAS/RIST with the juvenile offender population, specifically those that reoffend, is limited. Additional research is recommended to support its use with this population.

This study will examine the relationship between intelligence, age at time of psychological evaluation, and recidivism in a sample of juvenile offenders. This study will also
examine the clinical utility of the RIST as a brief intelligence screener for the purposes of identifying those at greater risk for recidivism. The participants in this study will be court-referred from the Georgia Department of Juvenile Justice for a psychological evaluation to aid the court with diagnosis, treatment, and/or placement recommendations. The combination of RIST scores and age of onset of criminal activity should reveal patterns that may facilitate identifying those juvenile offenders that will reoffend and those that will not. Results of this study may help identify youth that may require additional resources and support in an effort to decrease recidivism among juvenile offenders.

**Delimitations**

The current study focused the psychological evaluation of court-referred youth, ages 10 to 19. Individuals referred by the court to receive psychological evaluations, often exhibit more pronounced or nuanced personality and cognitive disturbances, comorbid mental health concerns, or have committed more severe crimes. Furthermore, the sample used in this study was not randomly selected, nor was a control group available to compare the juvenile offender’s cognitive patterns to those of the general population.
**Definitions and Operational Terms**

**Juvenile Offender:** For purposes of the current study, juvenile offender refers to any individual under the age of eighteen that has been charged with a criminal offense. Juvenile delinquent is used synonymously with juvenile offender in the current study.

**Recidivism:** In the current study, recidivism refers to any criminal charge or violation of law that has been committed within two calendar years following administration of the psychological evaluation. Recidivism was determined through analysis of legal history and court documentation provided by the Georgia Department of Juvenile Justice.

**Regional Youth Detention Center (RYDC):** a secure, supervised short-term facility which maintains custody of juvenile offenders who are waiting disposition of a crime, after found guilty of crimes, or are waiting to be placed back in the community or alternative placement after their needs are more thoroughly assessed (Georgia Department of Juvenile Justice, 2010).

**Person Offense:** Crimes committed against another individual including, but not limited to: rape, robbery, and aggravated assault (U. S. Department of Justice, 1996).

**Property Offense:** Crimes that are committed against one’s property and do not involve force or threat of harm to another person. These crimes include but are not limited to: burglary, arson, and vandalism (U. S. Department of Justice, 1996).

**Status Offense:** Crimes that are committed by a minors, that if others committed by an adult would not be considered a crime. These offenses include but are not limited to: unruly youth, curfew violation, and run away.
Research Questions

There are three main questions for the current study:

Question 1: Do male and female juvenile offenders differ on mean IQ scores on the RIST?

Question 2: Do the juvenile offenders that reoffend within 24 months exhibit a higher negative correlation between IQ and delinquency than those that do not reoffend?

Question 3: What is the nature of the relationship between gender, the age at time of psychological evaluation, RIST score, and 24-month re-offense status? To ask this question differently, does the combination of RIST scores and age at time of psychological evaluation adequately predict recidivism within 24 months?
CHAPTER 2

Review of Literature

Juvenile Delinquency

The juvenile justice system in the United States is tasked with establishing and maintaining policies that balance the interests of public safety, citizen accountability, and general welfare of its citizens. There has been a dramatic shift in juvenile justice policies over the last decade and a half. Following a substantial national increase in serious juvenile crime in the late 1980s and early 1990s, state officials passed new legislation in efforts to hold more young offenders more accountable for their actions. As research has indicated such policies have done little to curtail the problem, states have begun to re-examine those policies and establish more effective responses to juvenile delinquency. Promising new programs have emerged to divert youth from the system; shift resources away from secure facilities toward community-based alternatives; provide better public defense for youth; and respond more effectively to the mental health needs our youth (Brown, 2015).

Juvenile offenders are not “mini-adults.” Their needs are unique and varied. Most current research illustrates that the adolescent brain does not fully develop until approximately age 25. The immature, emotional and impulsive nature characteristic of adolescence makes this age group highly susceptible to delinquent and criminal acts without full understanding or consideration for their behavior. This is not to insinuate an absence of responsibility or accountability, but rather, to simply recognize that juveniles differ in how they recognize and
respond to risks, are influenced by peers, and in their capacity for change when compared to adults.

Between 2002 and 2012, the total number of arrests for juveniles significantly decreased from approximately 2.25 million to approximately 1.3 million representing an approximate decrease in total arrests by 37% and the lowest number of any of the previous 33 years (Puzzanchera and Kang, 2014). Furthermore, all four offenses that make up the Violent Crime Index between 2008 and 2012 saw substantial decreases: murder (–42%), rape (–24%), robbery (–39%), and aggravated assault (–35%). During this time span, the demographic background of juvenile offenders was most often male (71%) and White (65%) and between the ages of 16-17 (72%) (Snyder and Mulako-Wantota, 2014). In 2012, 22% of arrests involving youth who were eligible in their state for processing in the juvenile justice system were handled within law enforcement agencies and the youth were released, 68% were referred to juvenile court, and 8% were referred directly to criminal court. While such statistics are encouraging, they should not lead to a misplaced sense of complacency. Arrest data is considered a narrow indicator of juvenile delinquency due to the fact that most crimes are not reported. Furthermore, arrests are commonly documented based on new individuals and does not account for individuals being arrested multiple times. In addition, due to the new policy changes law enforcement agencies were responding differently to juvenile crimes than they may have previously. Thus, the amount of arrests reported may be an underrepresentation of actual crimes committed or may not fully portray the number of individuals committing these crimes.

The juvenile justice field has adopted a public health approach in an attempt to understand the etiology of delinquency and work toward its prevention. Just as the medical
community has made efforts to prevent and treat diseases like cancer and heart disease by targeting risk factors, the juvenile justice system has attempted to better understand the factors that contribute to juvenile delinquency. Lipsey and Derzon (1998) have linked several risk factors to delinquency. Risk factors may operate on the individual level (e.g. prenatal and perinatal factors or psychological, behavioral, and mental characteristics), community level (e.g. school policies, neighborhood), and social level (e.g. family structure, peer influences) (Shader, 2001). Over the last few years, researchers and policy makers have focused collaborative efforts toward providing proper screening and assessment to help determine risk factors present, and inform placement and treatment options to keep young people from continuing on a path deeper into the justice system.

**Recidivism among Juvenile Offenders**

Recidivism is considered one of the most fundamental concepts in criminal justice and key indicator of success for juvenile corrections agencies however it lacks broad acceptance in its definition and measurement. Most commonly it refers to a person's relapse into criminal behavior, often after the person receives sanctions or intervention for an adjudicated crime (National Institute for Justice, 2014). According to national statistics gathered from The Pew Charitable Trusts’ Public Safety Performance Project (2014), nationwide only 21 state agencies use some variation of one of the consensus standard definitions of recidivism. The most common definition is readjudication or conviction, currently used by 28 state agencies, but only 16 state agencies define recidivism to include a subsequent arrest and only 25 state agencies include formal commitment to a juvenile or adult corrections facility.
The lack of consistent definition leads to and is further complicated by inconsistent measurement of recidivism. Most state agencies fail to track juveniles the recommended 36-months to adequately measure recidivism and 11 states do not measure recidivism at all. As such, a national recidivism rate does not exist and state-to-state comparisons in recidivism rates are difficult. Failure to track recidivism makes it challenging to determine if the juvenile justice system is effective in deterring youth from subsequent contact with the juvenile or adult justice system. The Public Safety Performance Project (2014) identified 5 key steps to improve tracking of recidivism to help inform best practices in juvenile justice. Those recommendations include: (1) Measure recidivism for youth involved with the juvenile justice system, considering the multiple ways they may have subsequent contact with the justice system; (2) Analyze recidivism data to account for youth’s risk levels, as well as other key youth characteristics and variables; (3) Develop and maintain the infrastructure necessary to collect, analyze, and report recidivism data; (4) Make recidivism data available to key constituents and the general public; and (5) Use recidivism data to inform juvenile justice policy, practice, and resource allocation.

According to the 2011 Georgia Department of Juvenile Justice Recidivism Report, state agencies reported the recidivism rate for juvenile offenders for fiscal year 2009 were 34% after twelve months, 41% after twenty-four months, and 45% after thirty-six months (Georgia Department of Juvenile Justice, 2011). They found these results to be independent of severity of originating offense. Further, youth released from Short Term Programs (STPs) in secure out-of-home settings had the highest twelve-month recidivism rate (51%).
These results indicate that there is no “quick fix” to addressing recidivism and rehabilitation may require additional services and nuanced treatment programs.

Lueger and Cadman (1982) examined variables associated with recidivism. Their work found that repeat offenders were typically younger in age of initial contact with the juvenile justice system, have lower Full Scale, Verbal and Performance IQs, have a greater proportion of significant discrepancy between Verbal and Performance IQs, and terminate treatment prematurely. Likewise, seventy-five male offenders in Georgia were followed for thirty-two months to study the impact of race and mental health variables on reoffending. Wierson and Forehand (1995) determined that age at first arrest and more severe crimes committed were strong prognostic indicators for future offenses. They also found that these findings were qualified by race. Cottle, Lee, and Heilbrun (2001) conducted a meta-analysis of twenty-three published studies of recidivism, representing over 15,000 youth. Offense history variables, including earlier age of first contact, earlier age of first commitment, more prior arrests, more previous arrests, more previous commitments, longer incarcerations, and more severe crimes, were the strongest predictor of reoffending. Other relatively strong predictors included family and social variables (e.g. history of physical/sexual abuse, single-parent home, more out-of-home placements, significant family problems, delinquent peers, and ineffective use of leisure time), educational factors (e.g. history of special education, lower standardized achievement scores, lower FSIQ, and lower verbal IQ), clinical factors (e.g. history of conduct problems and nonsevere pathology). Barrett, Katsiyannis, and Zhang (2006) examined data for juvenile offenders in South Carolina for potential predictor variables associated with increased risk of recidivism while in the juvenile system. Consistent with previous findings, greater severity of the first criminal offense and younger age of first contact with the justice system were found to
be significant predictors. Neither race nor gender were found to be significant predictors of recidivism.

Desistance is the term most commonly used to identify the process by which a person arrives at a state of non-offending. Desistance is considered to be a "discrete state." In other words, the offender will either recidivate or permanently desist. Clear definitions and data collection methods are crucial to informing and identifying policies and strategies that can foster desistance, improve education, mental health services, and employment outcomes for this age group.

In the United States, there has been growing interest in crime prevention and desistance through early youth interventions. Years of increased use and resource allocation toward harsher punishment and incarceration has consistently shown to be expensive and ineffective in reducing juvenile delinquency and recidivism (Cohen and Piquero, 2007). A consistent finding across the literature indicates that criminogenic behavior that emerges earlier in the life course often continues into childhood, adolescence, and adulthood. This concept of “career criminals” shows that a relatively small subset of offenders is ultimately responsible for the majority of criminal offenses, especially the costlier property and violent crimes (Piquero, Farrington, and Blumstein, 2003). In fact, according to Piquero et al. (2012), most offenders reported engaging in few/no illegal activities after initial juvenile court involvement. Based on self-reports of delinquent behaviors, the overwhelming majority (92%) of adolescent, serious offenders decreased or limited illegal activity during the first 3 years following their court involvement.
As a result, early-onset criminal behaviors can have large financial implications for society. The Pittsburgh Youth Study, a longitudinal study of 500 youth aged 7-17, estimated the cost of juvenile offending and found that early-onset offenders (whose first offense occurred before age 13) averaged 34.2 offenses and imposed costs of $224,000. Chronic offenders (10.2% of the sample of offenders who represent 50.1% of all offenses), imposed between $793,000 and $861,000 in 2000 dollars and committed on average 142 offenses through age 17 (Welsh et al., 2008). Cohen and Piquero (2007) calculated the financial impact of a high-risk youth is estimated to be between $2.6 to $5.3 million at age 18, $3.2 and $5.8 million at age 14, and $3.2 and $5.5 million at ages 10. The comparable estimates for a heavy drug abuser are $370,000 to $970,000 and $243,000 to $388,000 for a high school dropout (Cohen and Piquero, 2007). In some cases, high risk juvenile offenders who began criminal activity early in life and continued through adulthood were estimated to impose total societal costs as high as $36 million. At this cost, even a 1–5% success rate would easily enable a rehabilitate program to pay for itself (Cohen and Piquero, 2007).

During the 2013 fiscal year, the total appropriations for the Georgia Department of Juvenile Justice exceeded $300 million, with nearly two-thirds of that budget directed to secure facilities (DJJ, 2013). Georgia’s secure facilities include Youth Development Centers (YDCs), which cost taxpayers approximately $91,000 per bed per year, and Regional Youth Detention Centers (RYDCs), which cost taxpayers approximately $88,000 per bed per year. More than half of the youth placed in secure detention were adjudicated for low-level offenses. Despite these massive financial costs, recidivism for youth released from secure facilities within the previous 36-months was over 65% (DJJ, 2013).
In a 2006 national survey, public interest favored spending more money on “prevention programs aimed to help keep youth out of trouble” compared to four other options: drug treatment programs for non-violent offenders, more police on the street, more spending on prisons, and even returning money to taxpayers (Cohen et al., 2006). Despite this finding, the United States continues allocate a relatively small percentage of resources to youth prevention programs compared to more punitive responses (Greenwood, 2006; Aos et al., 2004). As the old adage goes, “Big ships turn slowly”. Key policy makers have been slow to accept the paradigm shift away from “retributive justice” to more progressive views of “distributive or social justice” despite the research findings.

According to the Georgia Department of Juvenile Justice 2014-2017 Strategic Plan (2013), two of the major objectives include efforts to “Increase the percentage of youth who do not reoffend while in our care from 86% to 88%” and “Decrease the 3-year juvenile recidivism rate for the FY2014 cohort from 45% to 30%”. They intend to achieve these goals through collaboration with local probation agencies and key stakeholders to implement statewide use of objective decision-making tools to inform detention, commitment, and placement decisions (Georgia Department of Juvenile Justice, 2013). For this to be possible, a system-wide effort will need to be put forth to re-norm and validate all assessment tools used in the state to more accurately measure risk and outcomes. The adoption of empirically-supported assessment and decision-making tools may increase the number of low & medium risk offenders designated to evidence-based programs in their community (Georgia Department of Juvenile Justice, 2013). As more recent efforts to prevent and treat juvenile delinquency and recidivism begin to receive financial support, the need for accurate, cost-effective
assessment and targeted response interventions for high-risk juvenile offenders grows ever more critical.

**Intelligence and Juvenile Delinquency**

Research has consistently shown a negative correlation between juvenile’s intellectual abilities and delinquency (Lynam et. al., 1993). Across studies, delinquent youth score on average eight IQ points lower than non-delinquent counterparts on standard measures of intelligence. Additionally, this relationship appears to be stronger for verbal measures than nonverbal measures of IQ (Prentice & Kelly, 1963; West & Farrington, 1973).

There are three general ways in which IQ may be related causally to delinquency: A third variable may cause both low IQ and delinquency, in which case the relation is said to be spurious; a delinquent life-style may result in lower IQ scores; or a low IQ may lead to delinquency. Multiple debates have been discussed to the pathway that this correlation exists and mixed results have arisen. As many of these studies are dated, contemporary research should be conducted to support these findings.

Two distinct explanations of “spuriousness” in the IQ-delinquency debate have been posited: low-IQ offenders are likely to be detected by law enforcement at a greater rate and third variable (e.g. race and social class) increase likelihood of arrest. Moffitt and Silva (1988) addressed the first theory by using two separate participant groups—one that was detected of criminal offense by law enforcement agencies and individuals that self-reported to have had engaged in illegal behavior but were not arrested. Their findings indicated that average IQ scores did not differ between groups but that both groups performed significantly below their non-delinquent counterparts. With regard to social stratification, the theory that a third factor may impact IQ and delinquency has not stood up to scientific inquiry either. In an analysis of
literature available at that time, Hirschi and Hindelang (1977) found that the IQ-delinquency relationship held up regardless of social class or racial status. These findings have persisted in studies that also look at the intersectionality of multiple social identities (e.g. race plus SES) (Lynam, Moffitt, and Southamer-Loeber, 1993).

The second proposed theory suggest that factors related to a “delinquent life-style” (e.g. mTBI from head injuries sustained during fighting, drug use, etc) may result in lower intellectual functioning (Hare, 1984; Shanok & Lewis, 1981). While this theory may hold some truth, causal relationships have not been supported in the literature. There is limited support for this theory as prospective studies of juvenile delinquents indicate that lower delinquent IQ scores are present prior to the initiation of any criminal activities (Denno, 1990; Moffitt et al., 1981).

The third argument frequently cited in the literature assumes that lower IQ is one of the causes of delinquency. As low IQ is often associated with executive functioning, or a person's general ability to monitor and control his/her own behavior (e.g. sustaining attention and concentration, reasoning abstractly, forming goals, anticipating and planning, and initiating purposive behavior), those with executive dysfunction will frequently demonstrate inattention and impulsivity without considering the future implications of his/her actions. As most of the popular tests of executive functioning (e.g., Wisconsin Card Sorting Task and Trail Making Test) all share significant proportions of variance with IQ scores, IQ should exert some direct effect on delinquency. Additionally, IQ may also have indirect impacts on delinquency through school failure and detachment thus setting the stage for delinquency. This pathway is commonly referred to as the “School-to-prison pipeline” (Lynam, 1993).
Related to school detachment, much of the IQ-delinquency research has indicated that within the lower intellectual functioning of most juvenile offenders exists a significant discrepancy between nonverbal and verbal abilities, with nonverbal abilities more advanced than verbal abilities. In 1985, Tarter, Hegedus, Winsten, and Alterman assessed 101 juvenile offenders and found a significant difference between their performance on verbal abilities and nonverbal abilities such that the child performed higher on the nonverbal subtests on the WAIS and WISC-R. Examining the relationship between intelligence and delinquency in a sample of 157 youth convicted of serious crimes, Cornell and Wilson (1992) found that among their juvenile offender participants, average IQ was significantly lower than non-offenders and more than a third of offenders scored significantly higher on their Performance IQ than their Verbal IQ on the WISC-R. This discrepancy among verbal and non-verbal abilities is commonly found in situations of educational disengagement and may contribute to the onset of delinquent behaviors.

Most IQ-delinquency literature has focused on initial criminal activity and little research has examined the relationship between IQ and recidivism. In one of the few studies of its kind, Vermeiren, et al. (2002) determined that psychopathology and intellectual functioning in 64 male offenders was determined to be a good predictor of 2-year recidivism among male juvenile offenders. Through use of a binary logistic regression, they found that the combination of a diagnosis of conduct disorder, absence of a diagnosis of major depressive disorder, and a low verbal IQ explained approximately 44% of the total variance between those that recidivate and those that did not (Vermeiren et. al., 2002).

Competency to stand trial (CST) is a doctrine of jurisprudence that “allows for the postponement of criminal proceedings should a defendant be unable to participate in his or
her defense on account of mental disorder or intellectual disability” (Brown, 2015). Given such definition, one might expect intelligence to play a critical determination in fitness for trial. However, as defined in Dusky v. United States (1960), one must only have “rational as well as factual understanding of the proceedings” (p.402). As these laws were developed for adults and then subsequently applied to juvenile offenders, they do little to account for the underdeveloped cognitive and reasoning abilities commonly found in juvenile offenders. Only 23 states currently have specific legislation protecting youth found incompetent to stand trial on the basis of developmental immaturity, mental illness or intellectual disability (Brown, 2015). As any defendant’s right to a fair trial is one of the core principles of the United States’ criminal justice system, any variation in determination of competency raises grave questions regarding the administration of justice in both juvenile and criminal courts. To date no “gold standard” instrument or battery has been established to assess CST and formal evaluation of intelligence is not mandated. With the availability of brief intellectual screeners available, inclusion of such instrument could be argued as a small assurance of a basic element of constitutionally-protected liberty.

RIAS/RIST

The Reynolds Intellectual Assessment Scales (RIAS; Reynolds and Kamphaus, 2003) is a convenient, brief measure of general cognitive ability of individuals age three to ninety-four. The Reynolds Intellectual Screening Test (RIST; Reynolds and Kamphaus, 2003) provides clinicians with a quick overall estimate of general intelligence and determine if more thorough evaluation is recommended. The RIAS/RIST was developed in part to provide a time- and cost-efficient measure of fluid and crystalized abilities while maintaining high levels of construct validity. The structure of the RIAS/RIST subtests is intended to decrease the
instrument’s reliance on participant’s motor skills, eliminate possible biases based on gender
or ethnicity, and expand the age range of the measure across the lifespan (Reynolds and
Kamphaus, 2009).

Reynolds and Kamphaus were guided by theoretical, empirical, and practical
considerations through the development of the RIAS/RIST. The overall instrument is based on
the Cattell-Horn-Carrol theory of general intelligence, an amalgamation of the 1966 Cattell-
Horn model and Carrol’s 1993 Three-Stratum Hierarchy theory of intelligence (Woodcock and
Johnson, 1989). The RIAS also ascribes to the hierarchical construct of Sperman’s g,
measuring this higher order factor along with the lower order factors of fluid and crystalized
intelligence (Dombrowski and Mrazik, 2008).

Raymond Cattell, along with his student, John Horn, derived the concepts of fluid
intelligence (Gf) and crystallized intelligence (Gc) as discrete factors of general intelligence
(Horn & Cattell, 1966). Fluid intelligence is defined as the capacity to reason and analyze
novel problems, identify patterns and relationships, and generate answers through inductive
reasoning and deductive reasoning, independent of any knowledge from the past. It is
necessary for all scientific, mathematical, and technical problem solving. Crystallized
intelligence is the ability to use skills, knowledge, and experience. It does not equate to
memory, but it does rely on accessing information from long-term memory. Crystallized
intelligence is best described as one’s lifetime of intellectual achievement, such as one's
vocabulary or general knowledge. Fluid intelligence is believed to peak around age 20 before
decreasing, while crystallized intelligence is believed to improve with age and life experience.

Carrol’s Three-Stratum theory posits that intelligence is most accurately measured
through the combination of three stratum of intelligence, narrow (stratum I), broad (stratum II),
and general (stratum III), with each measuring different cognitive abilities (Carroll, 1993, p.633). Carroll states that each strata is not meant to be conceptualized as single higher-order strata forming multiple lower-order strata and thus it is not necessary to define the specific components of each strata (Carroll, 1993). Stratum I, includes certain skills or abilities necessary for the completion of a specific task. Carrol suggests that certain lower-order strata can load differently on multiple higher-order strata depending on the ability to be measured. Therefore, Strata I may often load onto the broad categories of Stratum II. Stratum II is understood as a broader categorization of different skills essentially measuring the same ability. Carroll provided eight broad categories on Stratum II consisting of: Fluid Intelligence, Crystallized Intelligence, General Memory and Learning, Broad Visual Perception, Broad Auditory Perception, Broad Retrieval Ability, Broad Cognitive Speediness, and Processing Speed (Carroll, 1996). Therefore, crystallized intelligence, often referred to as verbal intelligence, is considered Stratum II. Carroll defines Stratum III as a single construct characterized as general intelligence that is the “conceptual equivalent to Spearman’s g” (Carroll, 1996, p. 2). Both theories converge with one another and ultimately suggest using a hierarchy of one general factor above multiple categories of abilities. This is often referred to the Cattell-Horn-Carrol, or CHC, theory (Schneider and McGrew, 2012).

Through psychometric investigations of cognitive abilities and human intelligence, a general intelligence factor emerged to quantify children’s mental performance across all cognitive tasks. Since its development by Charles Spearman in the early 1900’s, Spearman’s g has been widely used in the concept and formal measurement of intelligence. Buckhalt (2001) provides a concise definition of Spearman’s Law, the overarching principle of g, as, “When a sufficient number of individuals are given a sufficient number of mental tasks to
perform that are quantifiable along some metric, and the results are subjected to factor analysis, measures of all the tasks are positively correlated, and the variance among the tasks is best represented by two major categories: a large general factor Spearman named g, and smaller specific (s) factors” (p.102). The general factor, g, is often understood as one latent source of variance in all subtest scores, with all subtests having positive nonzero loadings on g (Jensen, 1998). Intelligence measures, such as the Wechsler Intelligence Scale for Children (WISC) or the RIAS, characterize Spearman’s g as the Full Scale Intelligence Quotient (FSIQ) and Composite Intelligence Index (CIX), respectively.

The CHC and Spearman’s g were used as the theoretical guide for the development of the RIAS. The RIAS is comprised of four subtests that make up the core scale, the Composite Intelligence Index (CIX), to provide an overall g factor of intellectual functioning. The Nonverbal Intelligence Index (NIX) and a Verbal Intelligence Index (VIX) correspond to crystallized and fluid intelligence, respectively. The Composite Memory Index (CMX) is comprised of two subtests designed to measure nonverbal memory and verbal memory. Thus, according to the CHC theory, the RIAS measures the broad abilities of Fluid Reasoning (Gf), Visual Processing (Gv), Comprehension-Knowledge (Gc), Short-Term Memory (Gsm), Long-Term Storage and Retrieval (Glr), as well as g (Keith and Reynolds, 2010).

The RIST is a brief screening instrument used to quickly assess g factor. The RIST consists of the verbal subtest, GWH, to provides a measure of crystallized intelligence and the nonverbal subtest, OIO, to provides a measure of fluid intelligence. The raw scores from these two subtests are summed and converted to a standard score, the RIST Index score. The RIST Index score is considered to be an accurate overall estimate of an individual’s general intelligence. Median coefficient alpha of .95 and a temporal stability coefficient of .84
corrected for restriction of range for the RIST Index scores were reported by the authors. Results from factor analytic studies as well as criterion-related and discriminant validity studies provide support for the construct validity of the RIST scores (Reynolds & Kamphaus, 2002). For the purpose of this study, only the RIST Index score was used.

Peer factor analytic analyses has produced varied interpretations of the factor structure of the RIAS compared to the original 3-factor models presented by Reynolds and Kamphaus (2003). Nelson, Canivez, Lindstrom, and Hatt (2007) conducted multiple factor analyses using a large sample (N=1163) of referred students ages 6-18. Using both the four- and six-subtest RIAS configurations, all factor extraction criteria suggested that only the g factor, CIX, was supported. Dombrowski, Watkins, and Brogan (2009) conducted several additional factor analytic analyses using the original standardization sample. Their results suggested only one factor should be extracted from the RIAS. They found that total and common variance accounted for by the g factor (CIX) exceeded that of the first order verbal (VIX) and nonverbal (NIX) factors indicating caution should be used when making interpretations beyond the general factor. Beaujean, McGlauglin, and Margulies (2009) examined the factor structure across three samples of school-age children. Their analyses found that a two-factor model (VIX and NIX) fit all three data sets better than a one-factor model (CIX).

Umphress (2008) conducted a comparison of the RIAS and the Weschler Adult Intelligence Scale – Third Edition (WAIS-III; Weschler, 1997) using a small sample (N=20) of individuals with suspected learning disability. Their findings suggest strong correlation between the CIX and FSIQ (r= 0.94), VIX and VIQ (r=0.89), and between the NIX and PIQ (r=0.88). However, there was a statistically significant difference in means and standard deviations for IQ scores below 80. This is likely a result of the RIAS NIX scores being
comparatively higher than PIQ scores in this sample. Therefore, some caution might be warranted when interpreting RIAS scores for individuals with lower IQ scores.

In a study of the convergent relationship between the RIAS and the Weschler Intelligence Scale for Children – Fourth Edition (WISC-IV; Weschler, 2003), Edwards and Paulin (2009) found significant positive correlations between conceptually similar subtests of each instrument for a sample of referred elementary school children. Similar to Umphress (2008), strong correlations were found between CIX and comparable global intelligence measures, in this instance the WISC-IV’s FSIQ and GAI. These findings continue to paint the picture that the RIAS may be best used for screening and broad identification of intelligence rather than more specific diagnostic purposes of learning disorders in educational settings.

Krach, Low, Jones, and Farrally (2009) compared the RIAS to the Woodcock-Johnson Tests of Cognitive Ability – Third Edition (WJ-III; Woodcock, McGrew, and Mather, 2001) in a college student sample. Their findings were consistent with previous research with strong demonstrated validity of the VIX and CIX and lower validity for the NIX. Nelson and Canivez (2012) found similar results using a sample of adults and adolescents seeking evaluation at a university-based clinic. Their results supported the one-factor model as better fit than the two-factor model and correlations with other measures of Gf and Gc on the WJ-III were supportive of the VIX but not the NIX.

Beaujean, Firman, Michonski, Berry, and Johnson (2010) studied trait validity of the VIX and NIX using a multitrait-multimethod correlation/covariance matrix with a group of college students. Using both observation of patterns and latent variable modeling, support for the VIX was found to be a strong measure crystallized intelligence; however, the NIX was found to be similar to measures of crystallized intelligence, instead of the fluid intelligence.
More research needs to be conducted on the RIAS with different populations before broader conclusions can be made.

More recently, Beaujean and McGlaughlin (2014) investigated invariance of the RIAS’ measurement of general intelligence for Black and White students referred for special education services. Results indicated strict invariance across subtest scores but g’s variance was different across groups. The scores from White students showed means scores were five points higher and almost twice the variability. As Millsap (1997) indicates, difference in latent variance is rather uncommon and thus additional research may be necessary to assess g’s predictive ability.

Overall, the RIAS is found to be a reliable and valid measure with sound psychometrics (Andrews, 2007). Due to the dearth of research focusing on the psychometric usage of different factor structures and no peer analyses of the RIST factor structure, some caution may be warranted until future research can support Professional Manual’s findings. Replication of the RIAS/RIST factor structure in independent samples is critical for making judgments about the validity of Reynolds and Kamphaus’ interpretation recommendations.

Spearman’s g, also known as psychometric g, is considered a well-established and stable construct among experts, yet, there continues controversial debates and opposing research to biological and sociocultural factors that may impact its assessment and interpretation. The genetic heritability of g has been purported to fall between 40 and 80 percent based on twin, adoption, other family study designs, and molecular genetic methods (Haworth, Dale, and Plomin, 2008). However, genetic research also provides the best available evidence for the impact of environmental influences on g: If heritability is 50%, that means that environmental factors must account for the remaining reliable variance.
In the nature/nurture debate of intelligence, one of the most often debated topics related to Spearman’s g is the presence of racial difference found on scores of intelligence with various measurement instruments. Jensen (1969) was one of the first researchers to identify differences found in IQ averages between American Blacks and Whites. Over the span of his 4-decade career, his work has demonstrated a substantial hereditary component to g, and that this difference has important societal consequences. More recent research indicates that, on average, Black test takers score 1-1.2 standard deviations below those of their White counterparts (Sacket, Schmitt, Ellingson, and Kabin, 2001).

However, as race is widely considered a social construct rather than a biological one, the presence of differences by virtue of race is likely better explained by social researchers. As Carroll (1997) explains, general ability scores should not be taken as direct measures of hereditary intelligence, but rather as measures of rate of progress over the life span in achieving full mental development. In fact, many researchers have focused on race and several other sociocultural aspects that can be related to differences in intelligence scores. Social science researchers continue to identify environmental factors effected by a person’s race, culture, or socioeconomic status that may contribute to a bias effect on an intelligence measure. For instance, Stobart (2005) contends that all intelligence measures are inherently biased due to differential access to resources by individuals and groups that may better prepare them to perform on intelligence measures.

With regard to gender, research has consistently demonstrated that that women tend to perform comparatively better than men on most verbal tests of intelligence and that men tend to perform better than women on average on visual–spatial tasks the effect sizes are generally small (Weiss, 2003). The overlap in the distribution of male and female IQ scores is often
greater than the difference between them. At the social level, there are both subtle and obvious
differences between the experiences and gender role expectations of females and males.
Models that account for these psychosocial variables have been successful in predicting
outcomes on intelligence measures and academic achievement (Eccles, 1987).

Continued debate and future research will focus on methodology and statistical design
to account for artifacts or bias in IQ assessments and researchers will continue to provide
recommendations and strategies to reduce bias and differences found in those measures. The
authors of the RIAS were intentional with their efforts to address some of these concerns in the
development of their measure. Extensive efforts were included to minimize cultural and
gender bias in the RIAS. Both objective (e.g. differential item functioning) and subjective
(e.g. expert consensus) item bias studies were undertaken to aid in the removal or modification
of test items determined to potentially bias the instrument (Dombrowski and Mrazik, 2008).

To conclude, significant changes have been made to the judicial system over the last
century. Juvenile offending represents a complex, systemic problem at both the societal and
individual level. Updated research needs conducted to identify if previous findings related to
psychological functioning of juvenile offenders are still supported. Researchers have
identified variables associated with juvenile delinquency and recidivism including: personality
factors, low intellectual scores, and early age of onset of criminal behavior. Limited research
has been published on g factor within the juvenile offender population using the RIAS/RIST.
The RIAS appears to maintain adequate psychometric properties across varied samples as
well as demonstrates high correlations with other empirically supported intelligence
measures. Continued investigation into psychometric support for the RIAS/RIST and the
relationship between IQ and continuation of criminal behaviors is critical to developing
impactful rehabilitation programs. The purpose of the current study is to look at a combination of the variables associated with juvenile delinquency and their ability to predict juvenile recidivism. This research would be beneficial to understand the dynamics not only of juveniles that continue to offend and guide programming for rehabilitation.
CHAPTER 3
RESEARCH METHODOLOGY

Participants

The current study consisted of court-referred youth charged with at least one criminal offense from a southeastern city comprised of approximately 124,000 people. Participants completed a psychological evaluation, including a RIAS, between the years 2003 and 2012. The current study’s participants consisted of 220 adolescents. Two-year recidivism data could not be collected for 18 of the participants due to other factors such as age and year of psychological evaluation. The age of the participants at time of psychological evaluation ranged from 10 years to 19 years old (M=15.26, SD=1.29). The gender breakdown of the participants was 155 males (76.7%) and 47 females (23.3%). Included in the sample, 102 participants identified themselves as Black/African American (50.5%), 74 participants identified themselves as White/Caucasian (36.6%), 20 participants identified themselves as Hispanic (9.9%), 4 participant identified themselves as Biracial (2.0%), and 1 participant identified themselves as Asian American (0.5%), and 1 participant identified themselves as Native American (0.5%). Demographic data is listed in Table 1. Recidivism was first coded as a dichotomous variable for both one year and two years after the psychological evaluation date. Recidivism was also coded categorically based on type of offense (i.e. person, property, drug, public order, and status) as well as classification of adjudication (i.e. felony or misdemeanor) and number of offenses per classification category. The total amount of
participants that recidivated after one year was 97 (44.1%). The total amount of participants that recidivated after two years was 90 (44.6%).

Both one-year and two-year recidivism data was used for each participant provided by Georgia’s Department of Juvenile Justice (DJJ) and the Juvenile Tracking System (JTS). At the time of the psychological evaluation, some juveniles were detained in a Regional Youth Detention Center (RYDC), while others resided in their respective communities.

Table 1
Demographic Characteristics of Participants
(N=202)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>155</td>
<td>76.7</td>
</tr>
<tr>
<td>Female</td>
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<tr>
<td>Race</td>
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<td>Black/African American</td>
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<td>9.9</td>
</tr>
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<tr>
<td>Asian American</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Data Collection

All the participants included in this study were referred by the Department of Juvenile Justice for a psychological evaluation to assist in determining appropriate placements and/or alternative treatment recommendations. The standard psychological evaluation battery included a clinical interview with the youth, the MMPI-A, a RIAS, and additional assessments as deemed clinically appropriate (i.e. a substance abuse measure, trauma measure, etc.).
The data for the current study were archival and not collected for the specific purposes of this current study. The current study utilized sample data from a larger research database maintained by the Juvenile Counseling and Assessment Program (JCAP) at The University of Georgia. JCAP is a research and service project intended to work primarily with court-mandated youth and provides various clinical services including: individual counseling, group counseling, in-home family counseling, and psychological evaluations (Calhoun, Glaser, and Bartolomucci, 2001). Psychological evaluations included in this study were completed by doctoral students at The University of Georgia Counseling Psychology program as part of JCAP and supervised by a licensed psychologist. All procedures were conducted in accordance with the ethical guidelines of The University of Georgia.

Official court documents were examined to determine legal outcomes for each offense (i.e. expunged, amended, or adjudicated). The DJJ and the JTS was utilized to determine recidivism through analysis of legal history. For the purposes of this study, subsequent arrests were not determined to be sufficient to be categorized as recidivism. In order to be determined a new charge, individuals needed to be arrested for the charges as well as adjudicated following their assigned court date. Adjudicated charges included status, misdemeanors, and felonies within the first twelve and twenty-four months after the date of administration of the psychological evaluation.

**Measures**

**RIAS/RIST**

The Reynolds Intellectual Assessment Scales (RIAS; Reynolds and Kamphaus, 1998) is a convenient, brief intelligence assessment instrument. It was developed to provide clinicians with a sound measure of general intelligence that reduces or eliminates examinee reading and motor
coordination requirements and can accurately predict academic achievement across a broad age range. Further, the simple, brief, and easy administration format was intended to further reduce racial and gender bias in testing (Reynolds and Kamphaus, 2003). The RIAS standardization sample consisted of 2,438 participants between the ages of three and ninety-four and represented a total of 41 states across the continental United States (Andrews, 2007; Reynolds and Kamphaus, 2003).

The RIAS is appropriate for use with individuals ages three to ninety-four and takes approximately 30 to 35 minutes to administer. The RIAS is comprised of six subtests in the full protocol and produces subtest scores based on T-score metric as well as four scale indices based on an IQ metric (i.e., Verbal Index (VIX), Nonverbal Index (NIX), Composite Memory Index (CMX), and the Composite Intelligence Index (CIX)). The NIX consists of the Guess What (GWH) and the Verbal Reasoning (VRZ) subtests. The VIX is comprised of the Odd-Item Out (OIO) and What’s Missing (WHM) subtests. The CMX comprised of the Verbal Memory (VRM) and Nonverbal Memory (NVM) subtests. The RIAS includes a Composite Intelligence Index (CIX) which combines the four subtests (GWH, VRZ, OIO, and WHM) for a general estimate of intellectual ability. The CIX does not take into account the individual’s verbal or nonverbal memory abilities, which is provided by the CMX.

The first verbal subtest, Guess What (GWH), measures individual’s working vocabulary and reasoning skills. Individuals are verbally provided a list of clues about an object, historical figure, or popular places and asked to state the answer. The Verbal Reasoning (VRZ) subtest measures the individual’s ability to identify abstract relationships between items and verbal knowledge. This is done by presenting the examinee an incomplete analogy with only one or two
words to complete the query. Individuals are required to first to recognize the relationship between the objects and then respond verbally to complete the sentence.

Odd-Item Out (OIO), a measure of nonverbal reasoning ability, presents the individual with a set of objects in a visual image with one item out of the group that does not fit perceptually or conceptually. Individuals must identify the item in the grouping that appears different from the others. What’s Missing (WHM) presents a visual image and the individual is required to identify the appropriate component that is absent from the image.

The memory subtests include a Verbal Memory (VRM) and Nonverbal Memory (NVM). VRM is designed to measure the individual’s ability to encode, store, and recall verbal material in a meaningful context. Individuals are asked to listen to a passage and asked to recite back to the examiner the presented stimuli. The NVM is designed to measure the individual’s ability to store visually-presented stimuli and recall the material. During this subtest, individual are presented with visual stimuli for five seconds, and then asked to identify the original stimulus among a group of six confounding stimuli.

The Reynolds Intellectual Screening Test (RIST) is comprised of two subtests, the Odd-Item Out (OIO) and Guess What (GWH) and takes approximately 10-15 minutes to administer. The summed scores from these two subtests are then converted to a standard score, the RIST Index score. This RIST Index score provides an overall estimate of an individual’s g factor (Reynolds & Kamphaus, 2002). Given that the RIST utilizes the same standardization sample, it shares similar psychometric properties to the full protocol. Reynolds and Kamphaus (2002) reported a median coefficient alpha of .95 and a temporal stability coefficient of .84 corrected for restriction of range for the RIST Index scores. Additionally, results from factor analytic studies
and criterion-related and discriminant validity studies provide support for the construct validity of the RIST. For the purpose of this study, only the RIST Index scores were used.

**Research Design**

The current study will present a discriminant function analysis. The researcher will examine data from 202 adjudicated juvenile delinquents who were court-referred to JCAP for psychological evaluation as well as recidivism outcomes. Specifically, the relationship of intellectual variables, age at time of psychological evaluation, and 24-month recidivism data will be examined.

**Statistical Analyses**

A descriptive analysis will first be conducted to determine the demographic characteristics of the participants (see Table 1) and ensure that all variables of interest are complete in the dataset. In order to answer the first two research questions, “Do male and female juvenile offenders differ on mean IQ scores on the RIST?” and “Do the juvenile offenders that reoffend within 24 months exhibit a higher negative correlation between IQ and delinquency than those that do not reoffend?”, a simple t-test will be conducted. In order to answer research question three, “Does the combination of RIST scores and age at time of psychological evaluation adequately predict those who will recidivate within 24 months?”, a discriminant function analysis will be performed. This analysis is an appropriate statistical tool to predict a categorical dependent variable by one or more continuous or binary independent variables. This statistical method is particularly useful in determining whether a set of variables is effective in predicting category membership. The purpose of conducting this
analysis is to identify which independent variables, IQ and age at time of psychological evaluation, are effective predictors of the dependent variable, recidivism.

**Assumptions**

Several assumptions have been made throughout the course of this study. It is assumed that participants in this study are representative of the typical juvenile offender population residing in both RYDC’s and community settings. It is also assumed that individuals performed to the best of their abilities on the RIAS. Further, it is also assumed that the JTS and court documentation were accurate at the time of data collection.

**Research Questions**

Many researchers have identified intelligence as primary risk factor in juvenile delinquency and subsequent re-offense. However, there has been no research to date that has focused on intelligence differences between juvenile offenders that recidivate and those that do not utilizing a brief intelligence screener.

There are three main questions for the current study:

**Question 1:** Do male and female juvenile offenders differ on mean IQ scores on the RIST?

**Question 2:** Do the juvenile offenders that reoffend within 24 months exhibit a higher negative correlation between IQ and delinquency than those that do not reoffend?

**Question 3:** What is the nature of the relationship between the age at time of psychological evaluation, RIST score, and 24-month re-offense status? To ask this question differently, does the combination of RIST scores and age at time of psychological evaluation adequately predict recidivism within 24 months?
CHAPTER 4
RESULTS

This chapter presents the results in the following order: (a) descriptive statistics of the participants, (b) independent t-tests for research questions 1 and 2, and (c) discriminant function analysis to test the hypothesis for questions 3.

Descriptive Statistics

The means and standard deviations for the research variables are provided in Table 3. In this sample, 90 of the 202 participants reoffended within twenty-four months of date of psychological evaluation (44.5%). The age at the time of evaluation ranged from 10 years to 19 years (M=15.26, SD=1.29). The total amount of felony offenses committed twenty-four months after administration of the psychological evaluation ranged from 0 to 14 (M=.32, SD=1.18). The total amount of misdemeanor offense committed after twenty-four months ranged from 0 to 13 (M=1.01, SD=2.09). The total amount of adjudicated delinquency charges committed after twenty-four months ranged from 0 to 20 (M=1.79, SD=3.21).

The RIST scores of the participant’s ranged from 16 to 63 (M=43.37, SD=9.57). The RIAS GWH scores of the participant’s ranged from 14 to 65 (M=40.61, SD=9.44). The RIAS OIO scores of the participant’s ranged from 22 to 66 (M=49.49, SD=7.27). The RIAS VIX scores of the participant’s ranged from 57 to 125 (M=87.87, SD=13.43). The RIAS NIX scores of the participant’s ranged from 42 to 128 (M=98.74, SD=11.78). The RIAS CIX scores of the participant’s ranged from 45 to 121 (M=91.87, SD=12.61). See Table 3 for statistics.
Table 2

Means and Standard Deviations

<table>
<thead>
<tr>
<th>Variable</th>
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<tbody>
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<tr>
<td>RIST</td>
<td>43.37</td>
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<tr>
<td>GWH</td>
<td>40.61</td>
<td>9.44</td>
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<td>OIO</td>
<td>49.49</td>
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<td>NIX</td>
<td>98.74</td>
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</tr>
<tr>
<td>CIX</td>
<td>91.87</td>
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<td>Number of felony charges (24-months)</td>
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<td>2.09</td>
</tr>
<tr>
<td>Number of adjudicated delinquency charges (24-months)</td>
<td>1.79</td>
<td>3.21</td>
</tr>
</tbody>
</table>

Independent Samples t-Test

Research Question 1: Do male and female juvenile offenders differ on mean IQ scores on the RIST?

It was hypothesized that male and female juvenile offenders would differ based on mean IQ scores on the RIST. The standard scores on the RIST were used to answer this question. An independent sample t-test was performed to test this hypothesis. No statistically significant difference in mean score on the RIST was identified between male (M=43.68, SD=9.75) and female (M=42.34, SD=8.97) juvenile offenders (t=0.842, p=0.401). Additional exploratory independent sample t-tests were conducted to understand gender differences on the subtests that comprise the RIST, GWH and OIO, as well as RIAS index scores, VIX, NIX, and CIX. Statistically significant differences were found for GWH between males (M=41.37, SD=9.41) and females (M=41.37, SD=9.41); (t=2.11, p=0.036), but not for OIO males (M=49.19, SD=7.52) and females (M=50.45, SD=6.33); (t= -1.036, p=.301). Statistically significant differences were not found for VIX males (M=88.56, SD=13.74) and females (M=85.60,
Research Question 2: Do the juvenile offenders that recidivate within 24 months exhibit a higher negative correlation between IQ and delinquency than those that do not recidivate?

It was hypothesized that juveniles that recidivated within 24-months would exhibit a higher negative correlation between IQ and recidivism when compared to those that do not recidivate. Again, the standard scores on the RIST were used to answer this question. An independent sample t-test was performed to test this hypothesis. Statistically significant difference in mean score on the RIST was identified between offenders that did recidivate (M=41.74, SD=9.24) and those that did not recidivate (M=44.68, SD=9.67) within 24-months of evaluation (t= -2.186, p=.030). Additional exploratory independent sample t-tests were conducted to understand recidivism differences on the subtests that comprise the RIST, GWH and OIO, as well as RIAS index scores, VIX, NIX, and CIX. Statistically significant differences were found for GWH for those that did (M=39.14, SD=9.25) and those that did not (M=41.79, SD=9.47) recidivate; (t= -1.991, p=.048), but not for OIO for those that did (M= 48.50, SD=7.18) and those that did not (M=50.28, SD=7.27) recidivate; (t= -1.736, p=.084). Statistically significant differences were found for VIX for those that did (M=85.77, SD=12.73) and those that did not (M=89.56, SD=13.79) recidivate; (t= -2.012, p=.046) and CIX for those that did (M=89.81, SD=11.83) and those that did not (M=93.53, SD=13.02) recidivate; (t= -2.100, p=.037), but were not found for NIX for those that did (M=97.22, SD=11.13) and those that did not (M=99.96, SD=12.20) recidivate; (t= -1.645, p=.101). See Table 5 for statistics.
Table 3

Independent samples t-test for mean IQ scores and gender

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIST</td>
<td>42.34</td>
<td>8.97</td>
<td>43.68</td>
<td>9.75</td>
<td>0.842</td>
<td>0.401</td>
</tr>
<tr>
<td>GWH</td>
<td>38.09</td>
<td>9.18</td>
<td>41.37</td>
<td>9.41</td>
<td>2.111</td>
<td>0.036*</td>
</tr>
<tr>
<td>OIO</td>
<td>50.45</td>
<td>6.33</td>
<td>49.19</td>
<td>7.52</td>
<td>-1.036</td>
<td>0.301</td>
</tr>
<tr>
<td>VIX</td>
<td>85.60</td>
<td>12.20</td>
<td>88.56</td>
<td>13.74</td>
<td>1.329</td>
<td>0.185</td>
</tr>
<tr>
<td>NIX</td>
<td>94.89</td>
<td>10.99</td>
<td>99.90</td>
<td>11.80</td>
<td>2.589</td>
<td>0.010*</td>
</tr>
<tr>
<td>CIX</td>
<td>88.32</td>
<td>11.63</td>
<td>92.95</td>
<td>12.73</td>
<td>2.227</td>
<td>0.027*</td>
</tr>
</tbody>
</table>

*p<.05

Table 4

Independent samples t-test for mean IQ scores and 24-month recidivism

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<thead>
<tr>
<th></th>
<th>Recidivate</th>
<th></th>
<th>Non-Recidivate</th>
<th></th>
<th>t-test</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIST</td>
<td>41.74</td>
<td>9.24</td>
<td>44.68</td>
<td>9.67</td>
<td>-2.186</td>
<td>0.030*</td>
</tr>
<tr>
<td>GWH</td>
<td>39.14</td>
<td>9.25</td>
<td>41.79</td>
<td>9.47</td>
<td>-1.991</td>
<td>0.048*</td>
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<tr>
<td>OIO</td>
<td>48.50</td>
<td>7.18</td>
<td>50.28</td>
<td>7.27</td>
<td>-1.736</td>
<td>0.084</td>
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<tr>
<td>VIX</td>
<td>85.77</td>
<td>12.73</td>
<td>89.56</td>
<td>13.79</td>
<td>-2.012</td>
<td>0.046*</td>
</tr>
<tr>
<td>NIX</td>
<td>97.22</td>
<td>11.13</td>
<td>99.96</td>
<td>12.20</td>
<td>-1.645</td>
<td>0.101</td>
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<tr>
<td>CIX</td>
<td>89.81</td>
<td>11.83</td>
<td>93.53</td>
<td>13.02</td>
<td>-2.100</td>
<td>0.037*</td>
</tr>
</tbody>
</table>

*p<.05

Discriminant Function Analysis

Research Question 3: What is the nature of the relationship between gender, the age at time of psychological evaluation, RIST score, and 24-month re-offense status?

This research question was developed based on previous research findings suggesting that scores on intellectual measures and age of onset of criminal behavior can adequately predict juvenile delinquency. It was hypothesized that by combining the two variables, recidivism among juveniles referred for psychological evaluation would be adequately differentiated between those juveniles that do not recidivate within 24-months of evaluation.
Discriminant function analysis (DA) was used to determine which continuous variables, RIST scores and/or age at time of psychological evaluation, discriminate between groups of juveniles that recidivate within 24-months or not. The overall Chi-square test was significant (Wilks λ =0.858, Chi-square =30.505, df =2, Canonical correlation =.377, p=.000); the function extracted accounted for approximately 14.2% of the variance in 2-year recidivism, confirming the hypothesis. Reclassification of cases based on the new canonical variables was successful: 67.8% of the cases were correctly reclassified into their original categories. The sensitivity of the model was classified as 51.1%, and the specificity was 81.3%. The summary of the DA focusing on the individual variables in the equation resulted both variables, RIST scores and age at time of evaluation, meeting statistical significance. See Tables 7-13 for the classification table and summary of the DA for RIST scores and age at time of psychological evaluation in predicting 24-month recidivism.

**Table 5**

Group Statistics

<table>
<thead>
<tr>
<th>Recidivate</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIST</td>
<td>41.74</td>
<td>9.24</td>
</tr>
<tr>
<td>Age</td>
<td>14.76</td>
<td>1.34</td>
</tr>
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<td></td>
</tr>
<tr>
<td>RIST</td>
<td>44.68</td>
<td>9.67</td>
</tr>
<tr>
<td>Age</td>
<td>15.66</td>
<td>1.09</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIST</td>
<td>43.37</td>
<td>9.57</td>
</tr>
<tr>
<td>Age</td>
<td>15.26</td>
<td>1.29</td>
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</table>
Table 6

Tests of Equality of Group Means

<table>
<thead>
<tr>
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<th>Wilks' Lambda</th>
<th>F</th>
<th>Sig.</th>
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<tr>
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<tr>
<td>Age</td>
<td>0.878</td>
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</table>

Table 7

Box’s Test of Equality of Covariance Matrices

<p>| | | |</p>
<table>
<thead>
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</thead>
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<tr>
<td>Box's</td>
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<tr>
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</tr>
<tr>
<td>df1</td>
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</tr>
<tr>
<td>df2</td>
<td>13147250.570</td>
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</tr>
<tr>
<td>Sig.</td>
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</table>

Table 8

Summary of Canonical Discriminant Functions

<table>
<thead>
<tr>
<th></th>
<th>Eigenvalue</th>
<th>Canonical Correlation</th>
<th>Wilks' Lambda</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>Factor</td>
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<td>0.377</td>
<td>0.858</td>
<td>30.505</td>
<td>2</td>
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</table>

**p<.01

Table 9

Classification Function Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Recidivate (24-months)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
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<tr>
<td>RIST</td>
<td>0.491</td>
</tr>
<tr>
<td>Age</td>
<td>10.206</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-86.363</td>
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</table>

Fisher's linear discriminant functions
Table 10

Standardized Canonical Discriminant Function Coefficients and Structure Matrix

<table>
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<tr>
<th></th>
<th>Standardized Canonical Discriminant Function Coefficients</th>
<th>Structure Matrix</th>
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</thead>
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<tr>
<td>RIST</td>
<td>0.398</td>
<td>0.380</td>
</tr>
<tr>
<td>Age</td>
<td>0.925</td>
<td>0.917</td>
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</table>

Table 11

Classification Results

<table>
<thead>
<tr>
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<th>Recidivate (24-months)</th>
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<th>No</th>
<th>Total</th>
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</thead>
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<tr>
<td>Original Count</td>
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<td>44</td>
<td>90</td>
</tr>
<tr>
<td></td>
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<td>44</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21</td>
<td>91</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>51.1</td>
<td>48.9</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>18.8</td>
<td>81.3</td>
<td>100</td>
</tr>
<tr>
<td></td>
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<td>81.3</td>
<td>100</td>
</tr>
<tr>
<td>Cross-Validated</td>
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<td>90</td>
</tr>
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<td>46</td>
<td>44</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21</td>
<td>91</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>51.1</td>
<td>48.9</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>18.8</td>
<td>81.3</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18.8</td>
<td>81.3</td>
<td>100</td>
</tr>
</tbody>
</table>
CHAPTER 5
DISCUSSION

The current study was conducted to identify potential predictor variables of recidivism among a sample of juvenile offenders that were court-referred for psychological evaluation. As nationwide efforts are implemented to reduce overall crime, identifying psychological characteristics of juvenile offenders to differentiate them between those at greatest risk to recidivate continues to be an important focus in forensic psychology literature. These findings may aid in the screening of youth at risk for recidivism and guide future treatment opportunities to rehabilitate offenders.

Overview of Independent Sample t-Test Analyses

Previous research has indicated, while the effect sizes are generally small, women tend to perform comparatively better than men on verbal tests of intelligence and men tend to perform better than women on average on visual–spatial tasks (Weiss, 2003). Overall intelligence tends to show negligible gender differences. As noted previously, the authors of the RIAS/RIST were intentional in their efforts to minimize cultural and gender bias in the RIAS (Dombrowski and Mrazik, 2008). The current study found no significant differences in mean IQ scores on the RIST for male and female juvenile offenders. Secondary exploratory analyses found statistically significant gender differences for mean scores on the NIX and ClX as well as the GWH subtest. The scores on the NIX are consistent with previous findings of comparative better performance by males on non-verbal measures. The GWH subtest, which is reported to
measure verbal intelligence, was somewhat surprising given prior research findings. However, as the VIX did not show mean differences, these findings underscore the need for additional analysis of factor structure models and trait validity between subtests and composite indices. Additionally, interpretations on gender differences between the CIX and RIST are difficult as peer research comparing the two measures is not available at this time.

The current study also adds to the existing body of knowledge on intelligence measures and recidivism among juvenile offenders. Using the RIST as a brief screening measure of $g$ factor, the results of the current study support the hypothesis that recidivism would be negatively associated with intelligence. In fact, the current study found statistically significant inverse relationships between the RIST, CIX, VIX, and the GWH subtest and 24-month recidivism. This finding is consistent with previous research in this area. Extant literature has consistently shown a negative correlation between juvenile’s intellectual abilities and delinquency (Lynam et. al., 1993; Koolhof et. al., 2007). Research has also identified higher IQ as a protective factor for delinquency and recidivism (White, Moffitt, and Silva, 1989). These findings are also consistent with factor analytic studies of the RIAS that have endorsed the RIAS as being most appropriate as a single-factor assessment of $g$ with the CIX, while possessing some support of the VIX as a measure of crystallized intelligence, and lacking support for the NIX as a measure of fluid intelligence (Beaujean et al., 2010; Nelson and Canivez, 2012)

**Overview of Discriminant Function Analysis**

The current study expanded on the previous research by combining factors that have been previously been identified as predictors of juvenile delinquency and recidivism. Specifically, overall intelligence and age at the time of psychological evaluation were examined
in the current study. It was hypothesized that the combination of age and intelligence would adequately differentiate juveniles that would recidivate and those that would not. The results of the DA suggested that by combining the age at time of psychological evaluation and intelligence measure of the participants, the function accounted for approximately 14.2% of variance in 24-month recidivism, thus supporting the hypothesis. These findings are in line with previous research. Taken in conjunction with aforementioned research findings on intelligence, studies have consistently found age of admission into the juvenile justice system is a predictor for juvenile recidivism (Lueger and Cadman, 1982; Barrett, Katsiyannis, and Zhang, 2006).

Unfortunately, the model’s sensitivity was only slightly above that anticipated by chance alone (51.1%); however, the specificity level was at 81.3%. Therefore, in practical terms, the combination of RIST scores and age could help accurately classify those least likely to recidivate at a rate of 81.3%. This could have large financial and social impact as critical resources could be reserved for those at greater risk of recidivism and more targeted community interventions can be provided for lower-risk youth. These findings suggest the RIST, in combination with age, may show promise as an efficient screener for youth at lower risk of recidivism.

The lack of sensitivity found with the identified factor makes intuitive sense. Juvenile delinquency and recidivism is a complex, multi-system issue, and therefore, it requires a multidimensional and multi-causal paradigm that takes into consideration variables associated with the characteristics of the child, the ecological contexts within which the child lives, and the interactions among these variables (Calhoun, Glaser, & Bartolomucci, 2001). Effective programming and treatment designed to rehabilitate juvenile offenders with mental health
concerns requires efficient and efficacious assessment of these principal factors in order to inform judicial decision making and appropriate service referrals. As outlined in Rayner, Kelly, and Graham (2005), in order to effectively reach high-risk offenders, long-term solutions need provided.

Limitations

This study examined and differentiated groups of juvenile delinquents based on status of individuals that did and did not recidivate within 24-months. For the purposes of this study, recidivism was defined as individuals that were caught, arrested, and charged with new offenses during that time frame.

Another limitation associated with juvenile recidivism is difficulties in accurately tracking repeat offending. In the current study, recidivism was identified through the Georgia DJJ JTS and official court documentation. As with every data system, human error may impact the accuracy of the data. As a research quality control measure, recidivism data was entered and re-entered to help identify and eliminate inconsistencies in data input. However, clerical errors or omissions in the JTS and court records may still have impacted results. Another limitation associated with JTS is that inconsistent reporting across counties in Georgia and lack of national tracking procedures. Therefore, it would be possible for participants to have committed illegal acts outside of their county of residence and not be identified by the system used in the current study. As such, individuals in the non-recidivism category may have reoffended in a different county or state and avoided reclassification. While this is considered unlikely, the possibility exists and a newer, centralized data collection process has been implemented in the state of Georgia. As desistance is considered to be a permanent state of non-offending, longitudinal studies and improved tracking of youth as they
transition into the purview of the adult justice system would also aid in accuracy of quantifying recidivism.

This study restricted analyses to recidivism as defined by charges that were formally charged and adjudicated. Official court documents were compared to juvenile records provided by the Georgia DJJ. For various reasons, it is not uncommon within the juvenile justice system that some charges may have been dismissed or adjudicated informally. Therefore, similar to previous concerns raised by Kauffmann (2001), some caution is warranted as the data may be more indicative of the processes of judicial system and not accurately represent all illegal acts committed by juvenile offenders.

Another limitation of the current study is the use of age at time of psychological evaluation as a proxy variable for age of onset of criminal activity. While not a direct replacement, it is believed that youth referred for evaluation at a younger age were also identified through criminal activity at a younger age. However, this may introduce sampling bias as the reason(s) for psychological referral was not accounted for in this study. As this was not a randomized sample, court officials may have suspected more severe or complex psychological concerns or considered some youth as having greater risk for recidivism and requested evaluation.

**Recommendations for Future Research**

There are several methodological aspects to consider and opportunities for improvement with future research. The same study could be conducted with a different intelligence measure to explore if differences emerge. The RIST was used in the current study due to time- and cost-effectiveness as well as its utility as a general intelligence screener. However, no research exists comparing the RIST and other intelligence measures to understand differences in scores.
of g factor. As this study may demonstrate some promise as a screening instrument, additional comparative studies need conducted to critically compare the RIST with other intelligence measures with solid psychometrics.

At this time, limited research has been conducted with the RIAS/RIST with the juvenile offender population. The intellectual measures most often used in previous research are various forms of the WAIS or WISC. As previous researchers have noted discrepancies in factor structure across various samples, it would be prudent to examine the factor structure of the RIST/RIAS with juvenile offenders to ensure appropriateness of interpretation and recommendations with this population.

Additionally, there are no validity measures within the RIAS/RIST so the response style of the participants could not be adequately assessed. Concerns have been raised about the validity of intellectual testing with a population with high rates of defiance of perceived authority figures, mistrust of the system, and malingering (Salekin and Doane, 2010). It may also prove beneficial to incorporate malingering scales or ask qualitative questions about their performance after the administration of the RIAS/RIST to help ensure accurate representation of intellectual abilities. Additionally, RIAS/RIST scores could be compared to other academic scores (e.g. GPA, SAT/ACT scores, or standardized test scores) as additional assessment of performance.

Juvenile justice policy in the United States continues to evolve. With a relatively recent renewed focus on rehabilitation over punishment, the judicial paradigm has shifted toward supporting youth diversion and desistance. The need to additional research to ensure best practices in the rehabilitation of juvenile offenders and protection of the public presents an opportunity for psychologists to intervene in the justice system and provide an important service. Continued research into the biopsychosocial determinants of delinquency may offer
insight in the development and assessment of empirically-supported, cost-effective alternatives to secure detention for lower-risk offenders.
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doi:10.1177/009385480202900403


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doi:http://dx.doi.org/10.1016/0145-2134(94)90012-4


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