

PREDICTING RISK TO REOFFEND: ESTABLISHING THE VALIDITY OF THE POSITIVE
ACHIEVEMENT CHANGE TOOL

by

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ABSTRACT

In recent years, there has been increased reliance on the use of risk assessment in the juvenile justice system to predict and classify offenders based on their risk to reoffend. Over the years, the predictive validity of risk assessments has improved through the inclusion of actuarial assessment and dynamic risk factors. The predictive validity of certain assessments, such as the Youth Level of Service/Case Management Inventory (YLS/CMI), has been well established through numerous replication studies on different subgroups of the population. The validity of other instruments, such as the Positive Achievement Change Tool (PACT), is in its infancy having only been validated on the sample of the population for which it was created. The PACT, a relatively new juvenile risk assessment tool, was adapted from the Washington State Juvenile Court Assessment and validated on the Florida juvenile population. This study sought to demonstrate the predictive validity of the PACT risk assessment, analyze gender differences in juvenile recidivism, and determine the relative importance of individual-level, social-level, and community-level variables in the prediction of recidivism for a sample of juveniles in Tarrant County, Texas.

The results of this research confirmed the predictive validity of the PACT for juveniles served by Tarrant County Juvenile Services (TCJS). Despite possessing adequate predictive validity for the entire population, gender-specific analyses revealed differences in the ability of the PACT to accurately classify female delinquents based on risk to reoffend. Not only did gender differences emerge in the predictive validity of the PACT, but males and female recidivism was also predicted by different social-level indicators. The results of this research provided further evidence for social-causation theories of crime and delinquency, with social-level indicators exerting the strongest relationship with recidivism when compared to individual-

level and community-level predictors. The inability of community-level predictors to enhance the predictive accuracy of the assessment suggest broad application of the PACT across jurisdictions.

TCJS has invested a considerable amount of time, resources, and funding in the implementation and maintenance of the PACT. The results of this study provided support and direction for the continued use of the PACT at TCJS. In addition, establishing the predictive validity of the PACT on the Tarrant County juvenile population satisfied the legislative requirement for a population specific validation of the risk assessment implemented in each county.

Dedicated to the memory of my father, James, who taught me to do the very best at what I do each day.

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CHAPTER 1 INTRODUCTION

According to the National Institute of Corrections (n.d.), “assessing offenders’ risk and needs (focusing on dynamic and static risk factors and criminogenic needs) at the individual and aggregate levels is essential for implementing the principles of best practice.” The Office of Juvenile Justice and Delinquency Prevention (OJJDP) has incorporated risk assessments into their Comprehensive Framework for Juvenile Justice. OJJDP suggests that the use of risk assessments in juvenile justice system enhances equitability, increases accountability, expedites the decision-making process, and optimizes resource allocation (Howell, 1995). As of 2006, 86% of the 51 state juvenile justice systems mandated the use of a risk assessment at one or more phases in the system (Griffin & Brozynski, 2006).

Risk assessments have been created for various populations in the criminal justice system, including sex offenders (Hanson & Bussiere, 1998; Vilojen, Elkovitch, Scalora & Ullman, 2009; Viljoen et al., 2008), violent offenders (Catchpole & Gretton, 2003; Meyers & Schmidt, 2008), mentally ill offenders (Monahan et al., 2001), and juvenile delinquents (Schwalbe, 2007). The use of risk assessments in the juvenile justice setting is not unique to the United States. Jurisdictions in Canada (Andrews, Bonta & Wormwith, 1995; Jung & Rawana, 1999), England (Lancaster & Lumb, 2006; Palmer & Hollin, 2007), Australia (Putnins, 2005), Scotland (Burman, Armstrong, Batchelor, McNeill & Nicholsson, 2007) and Denmark (Lodewijks, Doreleijers & DeRuiter, 2008) have developed, validated, and/or implemented juvenile risk assessments. Furthermore, it is not uncommon for risk assessments to be jurisdiction or state specific, such as the Risk and Needs Assessment (RANA) used in counties across the state of Texas.

Evolution of Risk Assessments

Risk assessments, in the criminal and juvenile justice systems to predict future offending, have developed over time. First generation risk assessments were primarily based upon "unstructured clinical judgment" and the "gut-feeling" of the practitioner (Andrews, Bonta & Wormith, 2006). Being unstructured, clinical judgments might overlook or minimize significant predictive factors. Grove and Meehl (1996) argued "humans simply cannot assign optimal weights to variables, and they are not consistent in applying their own weight" (p. 315). The subjectivity and reliability of first generation assessments introduced a level of inconsistency and bias which led to the creation of objective, standardized assessment instruments using actuarial techniques (Hoge, 2002).

Second generation risk assessments were the first to introduce statistical techniques into the prediction of future offending. These assessments typically consisted of a limited number of static risk factors (e.g. criminal history, gender, age) (Schwalbe, 2008). By definition, static risk factors cannot be changed, and therefore do not provide a full understanding of the juvenile's current situation. The Wisconsin Juvenile Probation and Aftercare Risk Instrument (WJPA), Arizona Risk/Needs Assessment (ARNA), and North Carolina Assessment of Risk (NCAR) are examples of second generation risk assessments used to predict recidivism in the juvenile delinquent population.

As risk assessments further evolved, dynamic risk factors were added (third-generation). Dynamic risk factors are those factors that are time-varying and can change. Dynamic risk factors focus on the youth's current situation, rather than historical information. For example, if drug use is a predictor of delinquency, then a youth who is currently using drugs has a higher risk to offend than a youth who is not. If the youth receives treatment for his/her addiction and

becomes sober, then his/her risk to offend decreases. In addition, third-generation tools were largely based on criminological theory combining both individual-level and social-level variables in the prediction of risk (Andrews, Bonta & Wormwith, 2006). Third-generation juvenile delinquency risk assessments include Youth Level of Service/Case Management Inventory (YLS/CMI), Washington State Juvenile Court Assessment (WSJCA), and First Offender Risk Assessment Index (FORAI) (Schwalbe, 2007).

The introduction of dynamic risk factors and criminological theory in third-generation risk assessments paved the way for the inclusion of auto-generated case plans in fourth-generation tools. This most recent generation of assessments includes both static and dynamic, risk and protective factors that are used to inform case management. The Positive Achievement Change Tool (PACT) is an example of a fourth-generation risk assessment.

The goal of a risk assessment is twofold: enhance public safety while providing the youth with services aimed at curtailing his/her criminogenic needs. This goal is achieved by making targeted, cost-effective service referrals that minimize the juvenile's exposure to new and/or existing risk factors. A risk assessment tool identifies risk factors and determines strengths (protective factors) specific to the juvenile. The results of the assessment inform dispositional decisions and related case plans and provide a baseline to monitor the juvenile's success. With the results of risk assessment weighing heavily on decisions to involve a juvenile in the system, incorrect categorization could have a detrimental impact on the youth's life. Despite the growing number of risk assessments available to juvenile justice agencies, replication studies examining the construct and predictive validity of these tools on various populations are scant. The research conducted in this dissertation is intended to add to the growing body of literature establishing the predictive validity of risk assessments in the juvenile justice system.

Significance

Legislative Mandate

In 2009, the 81st Texas State Legislature mandated the completion of a risk and needs assessment on all juveniles prior to disposition. According to House Bill 3689,

A juvenile probation department must, before the disposition of a child's case and using a validated risk and needs assessment instrument or process provided or approved by the commission, complete a risk and needs assessment for each child under the jurisdiction of the juvenile probation department.

In response to this mandate, the Texas Juvenile Probation Commission (TJPC) developed the RANA, a risk assessment validated on Texas juvenile delinquents for statewide use. However, Tarrant County Juvenile Services (TCJS) had already invested considerable resources into the PACT. With Tarrant County's substantial commitment to and investment in the PACT, it is necessary to validate the PACT to ensure the instrument is adequately measuring risk to reoffend in the Tarrant County juvenile delinquent population. This research will inform future decisions based upon the continued use of the PACT by TCJS.

Tarrant County Juvenile Services

Tarrant County is the third most populous county in Texas, with approximately 1.7 million residents (Texas State Data Center, 2009). Fort Worth, the fifth most populous city in Texas and sixteenth most populous city in the nation, is the county seat of Tarrant County. Arlington, the seventh most populous city in Texas and fiftieth most populous city in the nation, is also located in Tarrant County. In Texas, a juvenile is legally defined as anyone over the age of nine and under the age of seventeen (Beckham, 2009). Juveniles account for 10% of the Tarrant County population (Texas State Data Center, 2009). In regard to the racial breakdown of

Tarrant County juveniles, approximately 42.9% are Caucasian, followed by Hispanic (33.9%), African American (17.1%) and Other (6.1%).¹

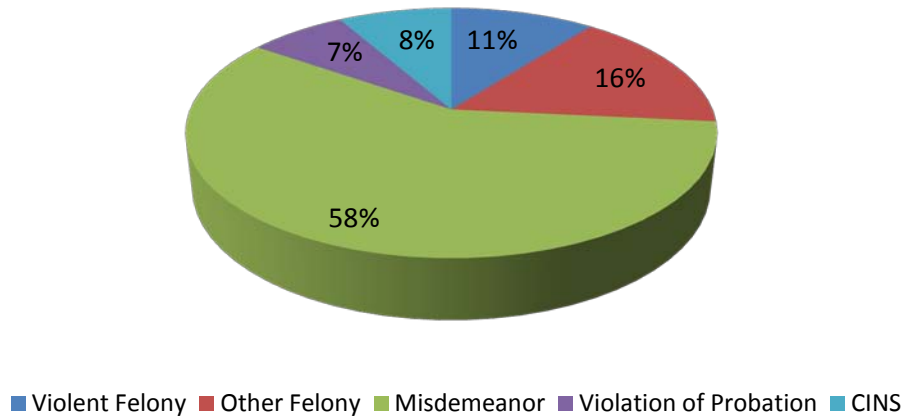


Figure 1. TCJS Referrals by Offense Type: 2009

In 2009, Tarrant County Juvenile Services (TCJS) received 5,680 formal referrals for 3,924 juveniles (Texas Juvenile Probation Commission, 2010). As depicted in Figure 1, the majority (58%) of the referrals received by TCJS in 2009 were for misdemeanors. Slightly more than one-quarter of referrals were for felony offenses, and less than half of the felony referrals were for violent offenses. The majority of youth who were referred to TCJS had allegedly committed a property crime, with misdemeanor theft representing the largest offense category. Approximately three-fourths of these referrals were for male delinquents. In regard to the racial distribution of the 2009 referrals, 37.7% were Caucasian, 35.9% African American, 24.5% Hispanic, and 1.8% Other.

The majority of the youth who referred to TCJS are diverted entirely from the juvenile justice system. In 2009, more than half (51.4%) of the referrals to TCJS resulted in the youth

¹ Other races are defined as all youth who self-identify as belonging to a race that is not Caucasian, African American, or Hispanic.

being counseled and released without being placed on supervision, while less than 30% of referral resulted in the youth being placed on court-ordered or deferred supervision. Furthermore, less than 3% (n=112) of the youth referred were committed to the Texas Youth Commission, and five youth were certified to stand trial in adult court. In Tarrant County, the most punitive consequences are reserved for youth who viewed as a threat to the community based on the seriousness of their offense or repeated failure to adhere to the conditions of supervision.

Table 1. Top 10 Tarrant County Zip Codes for Referrals to TCJS with Median Income

Zip Code	% 2009 Referrals	2008 Median Household Income
76119	4.57%	\$34,313
76010	3.66%	\$34,392
76112	3.58%	\$45,207
76106	3.02%	\$40,218
76105	2.85%	\$29,936
76133	2.72%	\$60,764
76014	2.72%	\$50,987
76180	2.67%	\$66,953
76116	2.44%	\$47,473
76104	2.39%	\$23,939
Tarrant County		\$56,251

In 2009, more than 30% of the referrals to TCJS were for youth residing in one of ten Tarrant County zip codes. In 2008, Tarrant County's median household income was \$56,251 (City-data, 2010). All but two of these zip codes had median household incomes below the median household income for the county. In addition, there is evidence to suggest that the majority of the youth who are referred to TCJS live in households at or below the poverty line. For example, 81% of the youth who received a court-ordered disposition in 2009 were represented by a court-appointed attorney, indicating indigence (Martin, 2010).

Positive Achievement Change Tool

The PACT was developed by Assessments.com and the Florida Department of Juvenile Justice for use on the Florida juvenile population. This assessment was primarily based upon the Washington State Juvenile Court Assessment, a tool that was created initially as a part of a strategy to reduce disproportionate minority confinement (Barnoski, n.d.). According to Baglivio (2009), “the Washington model is considered a ‘public domain’ tool, thus allowing Florida to customize the instrument to fit its needs” (p. 598).

Two versions of the PACT are utilized by TCJS. (1) The PACT Pre-Screen is a 46-item, multiple choice initial assessment instrument, which produces an "Overall Level of Risk to Reoffend" that measures the juvenile's risk to recidivate. Overall level of risk to reoffend categories include low, moderate, moderate-high, and high. This tool predicts overall risk to reoffend by examining the youth's record of referrals (delinquency history) and social history across individual-level and social-level risk factors. (2) The PACT Full-Screen is a 126-item, multiple choice in-depth assessment instrument that produces an overall level of risk to reoffend in addition to providing ancillary information necessary for supervision case planning. Unless responses are changed based on new information, the overall level of risk to reoffend is scored identically for both the pre-screen and full assessment (see Appendix A and Appendix B).

Each domain in both versions of the PACT relates to one or more of the “Big 8” criminogenic needs, and each can be categorized as either individual- or social-level risk factors. The PACT contains static and dynamic variables. Static variables are those that do not change; they are historical events in the youth's life (e.g. criminal history). In contrast, dynamic factors are variable, and can change (improve or worsen) over time (e.g. attitudes).

As previously mentioned, the PACT measures social history and record of referral to generate a youth's overall risk to reoffend. Record of referral is measured by selected indicators of the youth's criminal history. Included in record of referral score is (1) age at first offense, (2) number of misdemeanor and felony referrals for non-traffic misdemeanor or felony offenses that are either pending adjudication or have been adjudicated delinquent, (3) number of against-person misdemeanor and felony referrals that are either pending adjudication or have been adjudicated delinquent, (4) number of weapon related referrals that are either pending adjudication or have been adjudicated delinquent, (5) number of detentions in which the youth was detained for 48 hours or more, (6) number of commitment orders, (7) number of escapes, and (8) number of warrants issued for failing to appear in court. In the calculation of record of referral, the PACT considers unique delinquency events. If a referral contains multiple offenses, only the most serious is reflected in the record of referral score. In addition, if more than one referral with the same referral date is pending then only the referral containing the most egregious offense will count toward record of referral. Similarly, only the most egregious offense will be reflect on the PACT when multiple referrals are disposed on the same date.

Social history is measured by six criminogenic needs, including: (1) education, (2) pro-criminal/anti-social peers, (3) dysfunctional family features, (4) alcohol/drug use, (5) mental health problems, and (6) history of abuse/neglect. Record of referral scores range from 0-31, and social history scores range from 0-18, with higher scores indicating greater criminogenic need. A third domain, Attitude and Behaviors, is included on the PACT pre-screen, but does not factor into the overall level of risk to reoffend. Scores for attitude and behaviors range from 0 to 15, with higher scores indicating greater anti-social and/or violent criminogenic needs. The exclusion of this domain in overall level of risk to reoffend was examined due to antisocial

behavior, attitudes and beliefs being identified as "major" criminogenic needs most strongly associated with delinquency.

This study sought to establish the construct and predictive validity of the PACT in Tarrant County. The following research questions were answered.

1. Does the PACT's overall risk to reoffend predict recidivism, with higher risk youth being more likely to recidivate?
2. What factors included in the PACT predict the likelihood that a juvenile will recidivate in the 12 months following the administration of the risk assessment?
3. Are individual-level (nature) variables or social-level (nurture) variables more predictive of recidivism?
4. How does the inclusion of neighborhood-level factors impact the predictive value of the model?
5. Are there gender-specific differences in predicting recidivism by using the PACT instrument?

CHAPTER 2 LITERATURE REVIEW

Theoretical Framework

Principles of Effective Intervention

After reviewing evaluations of 231 rehabilitative correctional programs, Robert Martinson and colleagues famously concluded "with few and isolated exceptions, the rehabilitative efforts that have been reported so far have had no appreciable effect on recidivism" (Martinson, 1974, p. 25). In their meta-analysis of 50 published studies of juvenile correctional programs between 1975 and 1984, Whitehead and Lab (1989) found that less than one-third of the programs produced modest outcomes, and 14 of the programs actually produced poorer outcomes for program participants when compared to their comparison group counterparts. Bailey (1966) succinctly summarized his review of 100 studies of correctional programs with "evidence supporting the efficacy of correctional treatment is slight, inconsistent, and of questionable reliability" (p. 157). The findings from these analyses and others like them provided support for the "nothing works" argument and helped usher in a shift from rehabilitative to retributive corrections.

Recently scholars and practitioners alike have reexamined Martinson's conclusion. Do rehabilitative correctional programs simply not work as a whole, or are there elements of these programs that when present make it more likely the program will produce successful outcomes? Recently there has been a renewed interest in understanding which rehabilitative correctional programs work, who they work for, and in what context they work. According to Pealer and Latessa (2004), the principles of effective intervention are those "characteristics most commonly associated with effective programs" that have been identified through empirical research.

Included in the principles of effective interventions are the risk principle, needs principle, responsibility principle, treatment principle, and fidelity principle (Lowenkamp & Latessa, 2004; National Institute of Corrections, n.d; Pealer & Latessa, 2004).

The risk principle purports that the level of supervision and related services that an offender receives should directly relate to his/her risk to reoffend (Lowenkamp & Latessa, 2004). The risk principle is primarily concerned with prediction and matching (Andrews, Bonta & Hoge, 1990). According to Gendreau, Little and Goggin (1996), “the design of effective offender treatment programs is highly dependent on knowledge of the predictors of recidivism” (p. 575). In order to accurately identify those offenders with an increased probability of recidivating, it is necessary to use statistical prediction to determine which individual and social level characteristics are most indicative of recidivism. The risk principle is the basis for the creation of and reliance on risk assessment in the initial stages of the justice system. Once risk to reoffend is determined, high risk offenders should receive more intensive interventions, whereas low risk offenders should receive minimal or no intervention. While the risk principle helps determine who should receive sanctions and treatment, it is the needs principle that provides an understanding of what that treatment should target.

The needs principle suggests that interventions (services and programs) should target criminogenic needs. Criminogenic needs are those dynamic risk factors that are statistically associated with future delinquency. As dynamic risk factors, criminogenic needs can change, implying they are amenable to treatment. Criminogenic needs include but are not limited to current mental health needs, substance use/abuse, educational issues and aggression. According to the needs principle, improving upon a criminogenic need (i.e. engaging in and successfully completing treatment) should improve the chances that an individual will desist from criminal

behaviors. For example, a youth who is offending to support his/her drug habit would benefit greatly from treatment that targets his/her substance abuse. Andrews, Bonta, and Hoge (1990) suggested, "if reduction in the chances of recidivism is an ultimate goal, the more effective services are those that set reduced criminogenic need as intermediate target of service" (p. 20). French and Gendreau (2008) found that programs targeting three to eight criminogenic needs produced larger effect sizes than those targeting zero to two criminogenic needs. This finding is in line with the risk principle in that offenders with multiple criminogenic needs should be categorized a higher risk, and when high risk offenders are paired with appropriate services they often experience greater reduction in recidivism (Andrews, Bonta & Hoge, 1990). While it is important to determine which criminogenic needs are present in an offender's life, treatment targeting those needs must be responsive to individual offender differences.

Gendreau and Ross (1979) suggested, "the use of a single treatment method takes no account of individual differences, even though experimental research on learning has demonstrated time and again that individual differences are important" (p. 486). The responsivity principle maintains that interventions should be tailored to the individual characteristics of the participant, such as gender, age, developmental level, language and/or motivation to change. Responsivity factors do not necessarily contribute to delinquent or criminal behavior, rather they are characteristics that have the ability to impact the manner in which the offender responds to the treatment he/she is prescribed. Empirical research has repeatedly demonstrated that offender differences and nonprogrammatic factors (e.g. staff/client interactions, staff characteristics, setting) play a role in programmatic outcomes (Andrews, Bonta & Hoge, 1990; Gendreau & Ross, 1979; Palmer, 1995). Palmer (1995) recommended that program selection should take into account both the personal characteristics of the offender (e.g. personality type), as well as basic

demographic and social characteristics (e.g. gender). If not appropriately matched, offender characteristics could potentially hinder program effectiveness. Hubbard and Pealer (2009) suggested that offender characteristics have a cumulative effect, with the more responsibility "issues" an individual has the less likely he/she will benefit from rehabilitative interventions.

The treatment principle maintains rehabilitative treatment that targets deficits in current behavior must be incorporated into the sanctioning process and carried out through case management (Crime and Justice Institute, 2004). The concepts of punishment and treatment are not mutually exclusive in corrections (Robinson & Smith, 1971). The combination of treatment and surveillance should include evidence-based programs targeting appropriate offender subgroups. Research has repeatedly supported the use of a cognitive-behavioral approach to offender treatment (Izzo & Ross, 1990; Landenberger & Lipsey, 2005; Pearson, Lipton, Cleland & Yee, 2002; Lowencamp, Latessa, Smith, 2006; Wilson, Bouffard & MacKenzie, 2005). Izzo and Ross (1990) examined 46 studies of juvenile offender rehabilitation programs and concluded that there was a significant difference in recidivism rates between program with cognitive components and programs without. Landenberger and Lipsy (2005) confirmed these findings in their review of 58 evaluations of cognitive-behavioral therapy, concluding that on average cognitive behavioral therapy reduced recidivism by 25%, with reductions of more than 50% reported in some studies.

Finally, the fidelity principle suggests that program outputs and outcomes should be continually monitored to ensure and enhance program fidelity (Florida Department of Juvenile Justice, 2009). In the not so distant past, evaluations of juvenile justice programs were scarce, what was done was methodologically limited, and quite often outcome evaluations were completed without consideration of conducting a process evaluation (Wright & Dixon, 1977).

According to MacKenzie (2000), successful rehabilitation programs "must be of sufficient integrity to ensure what is delivered is consistent with the planned design" (p. 464). Monitoring and evaluation are used to confirm that programs are implemented and carried out as originally intended. Since programs are constantly adapted to new environments and new populations, it is necessary to verify that the inclusion of these features does not impact the effectiveness of the program on participant outcomes. Failure to adhere to the fidelity principle is frequently blamed for the overwhelmingly unsuccessful outcomes found by Martinson and colleagues (1974). Petersilia (1997) suggested that one of the primary challenges in probation is the disconnect between a program on paper and a program in practice. In their review of 68 studies regarding institutional misconduct, French and Gendreau (2008) concluded that program integrity was significantly related to treatment outcomes, finding that programs with high treatment integrity produced higher effect sizes ($r=.38$) than programs with moderate ($r=.20$) or low ($r=.13$) integrity.

Taken together, these principles of effective intervention have been documented to reduce recidivism in offender populations. Hanson, Bourgon, Hemus, and Hodgson (2009), found that programs that adhered to the risk, need, responsivity (RNR) principle produced better outcomes (decrease in recidivism) in sexual offenders than those programs without these features. In their review of cognitive-behavioral therapy studies, Landenberg and Lipsey (2005) concluded that the greatest reductions in recidivism were associated with higher-risk offenders (risk principle) and "high quality treatment implementation" (fidelity principle) (p. 451). After reviewing data from 38 community-based residential programs, Lowencamp, Latessa, and Smith (2006) found a strong correlation between program integrity and recidivism reduction, with program implementation, client assessment, and program evaluation producing significant

effects. Andrews, Zinger, Hoge, Bonta, Gendreau and Cullen (1990) reviewed studies of correctional treatment programs for adherence to risk, needs and responsivity principles. They compared four treatment types: criminal sanctions without treatment, services that incorporated RNR principles, services that explicitly contradicted RNR principles, and services where adherence to RNR principles was unable to be determined. They concluded "the major source of variation in effects on recidivism was the extent to which service was appropriate according to the principles of risk, need and responsivity" (p. 384). The average recidivism reduction in programs that adhered to the RNR principles was 53%.

Risk Principle

As previously mentioned, the risk principle is the first step in principles of effective intervention. Determining an offenders risk to reoffend impacts the initial decision to involve the offender in the system and subsequent decisions regarding disposition, treatment, and case management. In line with the risk principle, "higher levels of supervision may reduce the recidivism of higher risk probationers but will have no such effect on the recidivism of low risk cases" (Andrews, Kiessling, Robinson & Mickus, 1986, p. 377).

Research has repeatedly demonstrated that adherence to the risk principle leads to a better offender outcomes (Andrews, Bonta & Hoge 1990; Andrews & Dowden, 2007a; Brown, 1996; Hanley, 2006; Lowenkamp & Latessa, 2005; Lowenkamp & Latessa, 2002; Lowenkamp, Latessa & Holsinger, 2006; Marlowe, Festinger, Lee, Dugosh & Benasutti, 2006). In their meta-analysis of 97 correctional programs, Lowenkamp, Latessa and Holsinger (2006) concluded that utilization of the risk principle is strongly associated with reduced recidivism in both residential and non-residential programs. Andrews, Bonta, and Hoge (1990) found that juvenile programs targeting high-risk delinquents produced greater reductions in recidivism when compared to

programs that did not discriminate by risk level. In their review of Ohio halfway houses and community-based correctional facilities, Lowenkamp and Latessa (2002) found that the majority of the programs produced unsatisfactory results for low-risk offenders. Of the programs providing services to low-risk offenders (n=36), two-thirds produced no change (n=1) or found an increase in recidivism (n=35). Of the twelve programs that produced reductions in recidivism, the greatest reduction was 9%. In contrast, high-risk offenders experienced reductions in recidivism in the majority (72%) of the programs. The recidivism reductions ranged from a slight reduction of 2% to a pronounced reduction of 34%.

There is a substantial amount of literature supporting the finding that providing intensive services to low-risk offenders can in turn increase recidivism in this population (Bonta, Wallace-Capretta & Rooney, 2000; Hanley, 2006; Lowenkamp & Latessa, 2005; Lowenkamp & Latessa, 2002; O'Donnell, Lydgate & Fo, 1979). Andrews, Kiessling, Robinson, and Mickus (1986) cautioned that while placing low risk offenders into intensive services is a waste of resources, this activity has the potential to be "criminogenic" (p. 377). This phenomenon is sometimes referred to as the contamination effect, in that intermingling of low-risk and high-risk youth provide an opportunity for low-risk youth to learn "bad" behaviors from their high-risk peers. In the previously mentioned study, Lowenkamp and Latessa (2002) found that two of the programs that produced the recidivism reductions of more than 30% in high-risk offenders, resulted in increase in recidivism for low-risk offenders (7% and 29% increase). Hanley (2006), found that providing intensive services to low-risk offenders increased the likelihood of recidivism. Bonta, Wallas-Capretta, and Rooney (2000) found high-risk offenders receiving intensive treatment services recidivated at a 31.6% rate, compared to a 51.1% of the high-risk offenders in the comparison group. In contrast, 14.5% of low-risk offenders in the comparison group recidivated,

which was lower than the 32.2% recidivism rate for low-risk offenders who received intensive services. These findings represent a 19.5% decrease in recidivism for high-risk offenders participating in the intensive supervision program, and a 17.8% increase in recidivism for low-risk offenders participating in the program when compared to offenders with the same risk to reoffend. In their evaluation of a community-based mentorship program, O'Donnell, Lydgate, and Fo (1979) found that youth who had delinquency record for "major offenses", identified as high-risk youth, recidivated at lower rate than high-risk youth who did not participate in the program (56% and 78%, respectively). Low-risk youth, defined as youth who did not have a prior arrest for a "major offense", who participated in the program recidivated at higher rates than low-risk youth in the comparison group (22.5% and 16.4%, respectively). Lowenkamp and Latessa (2004) suggested that these results "dictate that we should direct the majority of services and supervision to higher-risk offenders because it is with this group of offenders that such interventions are more effective" (p. 8).

With the principles of effective intervention thoroughly defined, the importance of the risk principle becomes clear. Adherence to the risk principle establishes who the services are provided to. This serves as the first step in implementing evidence-based practices that adhere to the principles of effective intervention. However, the question remains, how should risk be determined?

Risk Factor Prevention Paradigm

Borrowing from the public health model, the risk factor prevention paradigm asserts that the first step in treatment is assessment. Assessment allows the practitioner to determine the nature and extent of the youth's criminogenic needs and develop a treatment protocol that

utilizes evidence-based interventions to respond to and counteract those needs (needs principle).

Case (2007) stated,

the jewel in the actuarialist crown is the ‘risk factor prevention paradigm’, a pragmatic crime prevention model that uses risk assessment and survey to identify factors in the key domains of a young person’s life (family, school, community, psycho-emotional) that statistically increase the likelihood of (official or self-reported) offending (‘risk’ factors) or decrease its likelihood (‘protective’ factors) (p. 92).

In regard to the prevention of future delinquency, it is necessary to assess the risk and protective factors present in a youth to determine his/her criminogenic needs. Mrazek and Haggerty (1994) defined risk factors as “those characteristics, variables, or hazards that if present for a given individual, make it more likely that this individual, rather than someone selected from the general population will develop a disorder” (p. 127). Risk factors have a "multiplicative" or "cumulative" effect in that the presence of multiple risk factors further increases the probability of a youth engaging in delinquent behaviors (Shader, 2003). While the presence of risk factors increases the chance that a youth will commit future delinquent acts, protective factors are those factors that buffer the youth from delinquency. These positive factors counteract exposure to risk factors, thereby lowering the probability of delinquency.

Social Selection and Social Causation

Risk factors for delinquency are rooted in criminological theory. While various perspectives of crime and delinquency exist, sociological theories and the variables associated with them dominate risk assessments. Sociological theories of crime and delinquency can broadly be divided into three general categories, social selection, social causation, and those that

combine aspects from both theoretical models. Social causation theories focus on the role relationships and social connections play in criminal behavior (Wright, Caspi, Moffitt & Silva, 1999). Social selection theories, while acknowledging the importance of social relationships, focus more on the impact of individual characteristics on offending behavior. In other words social selection theories are concerned with the individual's nature, while social causation focuses on how the individual was nurtured in his/her social environment. More recently, integrated theories of crime and delinquency have combined aspects of social causation and social selection.

Social control and social learning theories are rooted in social causation. Social control refers to using mechanisms that promote conformity and adherence to societal norms. Formal social control is mandated by legal statutes, rules, and regulations against deviant behavior. This type of social control is enforced through sanctions and fines. Informal social control involves an individual's social ties to conventional personal groups. Edwin Sutherland incorporated the social learning process into his theory of differential association (Burgess & Akers, 1966). He proposed that one of the main factors influencing deviant behavior is the ratio of favorable definitions to the law to unfavorable definitions. These definitions are learned through the socialization process and influenced by intimate relationships. He formulated nine propositions that he suggested influenced criminal behavior. According to Burgess and Akers (1966), the heart of Sutherland's theory rested on proposition six, "A person becomes delinquent because of an excess of definitions favorable to violation of law over definitions unfavorable to violation of law" (p. 280).

Gottfredson and Hirschi's theory of low self-control and crime, also referred to as the general theory of crime, is perhaps the most prominent criminological theory of social selection

(Akers & Sellers, 2004). This theory is considered a general theory of crime because according to Gottfredson and Hirschi it can “explain all individual difference in the ‘propensity’ to refrain from or to commit crime, including all acts of crimes and deviance, at all ages, and under all circumstances” (Akers & Sellers, 2004, p. 122). They attributed crime to low self-control, which is internalized during childhood. Low-self control is thought to be the product of ineffective parenting and inadequate socialization. Once internalized, self-control is thought to remain stable throughout the life-course. In other words, children who defy authority during their early years will continue to display similar behaviors as they age. Crime and other deviant activities provide immediate gratification, and those individuals who possess low-self control and are afforded opportunities to commit these acts will engage in such behaviors.

Robert Sampson and John Laub's age-graded informal social control theory integrates aspects of social selection and social causation (Sampson & Laub, 1993). In line with social selection, Sampson and Laub's theory purported that the development of antisocial behavior criminal propensity in childhood impacts the ability of a child to form positive social bonds in his/her adolescents. In addition, they realized that differences in childhood, such as parental monitoring and attachment, could positively or negatively affect social control. However, utilizing concepts from social bonding theory, they theorized that several “turning points” in an offender’s life, such as employment, family, and education promote desistance from criminal activity (Sampson & Laub, 1993). These milestones represent an attachment to pro-social attitudes and foster social bonds. As social bonds strengthen social capital increases, and the reward of criminal behavior diminishes. These aspects of control theory suggest that relationships to conventional establishments and people inhibit criminal activity. This can be used to explain why life course persistent offenders stop offending when they develop strong ties

to family and community, and those who fail to create these bonds continue offending. In addition, Sampson and Laub recognized that other structural factors; such as “poverty, residential mobility, family size, employment, and immigration status” play an important role in the differences control exerts on individuals (Lilly, Cullen & Ball, 2002, p. 258).

In their analysis of the criminal behavior of young adult males, Wright, Caspi, Moffitt, and Silva (1999) found support for "theoretical models that incorporate social-selection and social causation processes" (p. 480). As previously mentioned, current risk assessments are based on criminological theories, such as those presented above. Risk assessments integrate variables from both social selection and social causation theories in an attempt to gain a complete understanding of the youth's criminogenic needs and associated risk to reoffend. For example, the PACT incorporates differential association into the prediction of risk by assessing the youth's relationships with peers and family criminality. Through the social learning process, youth who associate with deviant peers and/or have a family member with a history of incarceration are at an increased risk of recidivating due to their familiarity with and perhaps favorable view of crime and delinquency. In addition, the PACT includes indicators of social control by assessing the degree to which a juvenile obeys the rules and restrictions set forth by his/her parent(s). Finally, social selection is represented in the PACT through the assessment of the youth's educational standing, mental health needs, and attitudes toward law-abiding behaviors.

Predictors of Recidivism

Essentially, risk factors are unaddressed individual- and social-level criminogenic needs. The “Big 8” are those major criminogenic needs most strongly associated with delinquency. These include a history of antisocial behavior, antisocial personality, antisocial attitudes and beliefs, pro-criminal peers, dysfunctional family features, low levels of educational and/or

vocational achievement, lack of involvement in prosocial activities, and substance abuse (Andrews & Dowden, 2007b). Based on the risk factor prevention paradigm, interventions that target deficiencies in these areas reduce the chance of future delinquency. Minor risk factors, such as mental health disorders, physical health problems, and social class, are “less promising intermediate targets for reduced recidivism” (Andrews & Dowden, 2007, p. 446).

Shader (2003) categorized risk factors of delinquency into three broad categories, individual-level factors, social factors, and community factors. Risk factors at the individual-level include those prenatal, psychological, behavioral, and mental characteristics that are correlated with delinquency. Many researchers have used indicators of criminal history exclusively in defining individual-level predictors of recidivism. The most significant predictor of future offending has traditionally been a history of offending (Bonta, Law & Hanson, 1998; Cottle, Lee & Heilbrun, 2001; Genreau, Little & Goggin, 1996; Loeber & Dishion, 1983). In their meta-analysis of juvenile recidivism research conducted between 1983 and 2000, Cottle, Lee, and Heilbrun (2001) found age at first commitment and age at first offense to be the strongest predictors, with the offense history domain significantly and consistently associated with an increased chance of reoffending. Genreau, Little, and Goggin (1996) found similar result in their meta-analysis of adult recidivism, concluding that the strongest predictor of adult recidivism was criminal history and criminogenic need factors. Bonta, Law, and Hanson (1998) extended this finding in their comparison of predictors of recidivism for non-disordered and mentally disordered offenders, concluding that the most significant predictors for both groups were related to criminal history. Other individual-level risk factors include substance use, educational performance, and aggression.

Social-level risk factors of delinquency are related to family structure, peer influences, and other social bonds. Social-level indicators of delinquency include antisocial parents, poor parental supervision, antisocial peers, and weak prosocial bonds. Empirical research has continually demonstrated a positive relationship between the presence of indicators of social control and desistance from crime (see Sampson & Laub, 1993; Horney, Osgood, and Marshall 1995). For example, Horney, Osgood, and Marshall (1995) found that individuals with a “high propensity” to commit crime are less likely to recidivate when they go to school, work, and/or are married. The relationship between parental incarceration (Murray & Farrington, 2005; Murray, Janson, & Farrington, 2007) and parental criminality has been established (Farrington, Jolliffe, Loeber, Stouthamer-Loeber, & Kalb, 2001; Murray, Janson, & Farrington, 2007). Juvenile with a history of parental incarceration and/or parental criminality have been found to be at an increased risk to engage in delinquent conduct when compared to juveniles without these characteristics. The dynamics of the parent/child relationship has been further documented to include parental support, adherence to household rules, and parental monitoring, all of which have been found to correlate with antisocial adolescent behavior and juvenile delinquency (Simons, Johnson, Conger; 1994; Wright & Cullen, 2001). In addition, the parent-child relationship has been found to exhibit an indirect effect on delinquency through the selection of peers (Ingram, Patchin, Huebner, McCliskey & Bynum, 2007). The role peer relationships play in delinquency has been well-documented, with associations to anti-social and delinquent peers increasing the risk that youth will engage in delinquent conduct (DeKemp, Scholte, Overbeek, & Engels, 2006; Granic & Dishio, 2003; Ingram, Patchin, Huebner, McCliskey & Bynum, 2007; Loeber & Farrington, 2000; Megens & Weerman, 2011).

More recently, researchers have begun to pay attention to the role that the community context plays in delinquent behaviors. Although there is need to further investigate the "immediate situational influence" of community factors on delinquency, sociological theories of criminology purport that neighborhoods characterized by disorganization generate higher rates of crime and delinquency (Shader, 2003, p. 6). Neighborhood disadvantage has been used as a construct in research across various disciplines, including psychology (Attar, Guerra & Tolan, 1994; Ingoldsby et al., 2006; Santiago, Wadsworth, & Stump, 2009), social work (Weiss, et al., 2011), delinquency and criminal behavior (Kubrin & Stewart, 2006; Sampson, Raudenbush & Earls, 1997; Teasdale & Silver, 2009; Vazsonyi, Cleveland & Wiebe, 2006), public health (Bauermeister, Zimmerman & Caldwell, 2010). Research has found disparate recidivism rates between neighborhoods characterized by disadvantage and more affluent neighborhoods, suggesting that neighborhood context is a correlate of delinquency (Kubrin and Stewart, 2006). Neighborhood has been defined at the zip-code, census tract, and census block levels. One of the first attempts to define the construct of "concentrated disadvantage" in neighborhoods was conducted by Sampson, Raudenbush and Earls (1997). They found five indicators (poverty, public assistance, female-headed families, unemployment, and density of children) and two a lesser extent proportion of African Americans loaded strongly onto one factor (eigenvalue greater than 5). In more recent research, indicators of unemployment, poverty, income, household type, educational attainment and residential mobility have been used to indicate the degree to which a neighborhood is characterized by disadvantage.

Theoretical Hypothesis: *Social causation and social selection indicators of delinquency are equally important in the prediction of recidivism.*

Gender Differences in Delinquency

The OJJDP reported that females represented approximately 30% of the 2.11 million juvenile arrests in 2008 (Puzzanchera, 2009). Although females represent a minority in the juvenile justice system, the rates at which they are being referred have increased over the last decade. In 1992, females accounted for 23% of all juvenile arrests (Snyder, 1992), compared to 27% in 1998 (Snyder, 1999), and 30% in 2008. Depending on the offense category, the proportion of female juvenile arrests has either decreased at a slower rate or increased when compared to their male counterparts. For example, while male arrests for simple assault decreased by 6% in 2008, female arrests for the same offense increased by 12% (Puzzanchera, 2009). Females represent approximately 25% of the annual referrals to TCJS (Martin, 2010).

Females delinquency differs from male delinquency on a number of levels. Female delinquency often involves less serious offenses than their male counterparts. For example, in 2008 females accounted for 17% of the arrests for violent index crimes compared to 44% of arrests for larceny-theft (Puzzanchera, 2009). Females make up a large proportion of arrests for status offenses. In 2008, 56% of the arrests for runaways and 31% of curfew violations involved a female. Finally, females account for more than three-quarters of annual arrests for prostitution, an offense associated with victimization and sexual abuse. The increased involvement of females in the juvenile justice system and gender difference in offending make it essential to understand the dynamics contributing towards their delinquent behavior. Are male risk factors for delinquency similar to those of females, or do significant gender differences exist in the prediction of future delinquency?

Howell (2003) suggested that female risk factors of serious, violent and chronic delinquency, while similar to those of males, may impact females differently thus increasing

their chance of delinquency. More specifically, five risk factors were identified: child abuse, mental health issues, a runaway history, gang involvement and prior juvenile delinquency. Johansson and Kempf-Leonard (2009) tested Howell's theory and found evidence to suggest these factors are not female-specific. While abuse was an insignificant predictor of both male and female delinquency, the other risk factors were significantly related to delinquency for males and females. Despite the negative findings in this study, others have found significant differences in male and female delinquency when examining social-level predictors of delinquency.

Relationships, especially those between the juvenile and parent, have been a topic of interest in understanding and predicting female juvenile delinquency. The attachment between a youth and his/her parents serves as a protective factor, decreasing the chance that a youth will engage in criminal behavior. Research has indicated that these relationships are stronger for females than males, and when these bonds are weak females are more likely to engage in risky or delinquent behaviors (Heimer & DeCoster, 1999; Huebner & Betts, 2002; Laundra, Kiger, & Bahr, 2002). Leve and Chamberlin (2004) analyzed individual child characteristics, family environmental factors, and parental criminality to predict female delinquency. They found parental transition, the number of adult household member transitions prior to age 13, and parental criminality to significantly predict age at first arrest. Similarly, LaGrange and Silverman (1999) found that differences in the level of adult supervision was significantly related to gender differences in delinquency. Liu and Kaplan (1999) found attachment to conventional values served as a mediating variable to delinquency, with males being more likely to engage in delinquent conduct due to their being "less bound to conventional values" (p. 195). Zahn et al. (2010) found "early puberty, coupled with stressors such as conflict with parents and involvement with delinquent (and often older) male peers, is a risk factor unique to girls" (p. 12).

In sum, empirical research has found support for gender-specific pathways to crime and delinquency.

In addition to gender-specific risk factors, differential rate of exposure to gender-neutral risk factors have been found to play a role in delinquency. A recent meta-analysis funded by the OJJDP examined more than 1,600 articles regarding individual-level, social-level, and community-level correlate of female juvenile delinquency (Zahn et al., 2010). Although female and male delinquents experienced similar risk factors, and those risk factors were predictive of delinquency, the rate of exposure for certain risk factors was greater for girls than boys. For example, female delinquents were more likely than their male counterparts to have a history of traumatic events (e.g. physical and/or sexual abuse), which could in turn lead to the development of a mental health issue, such as posttraumatic stress disorder. In their comparison of the prevalence of delinquency in females with a history of sexual abuse and those without, Siegel and Williams (2003) identified a history of sexual abuse and/or neglect as an indicator of violent juvenile offending, running away, and general adult offending.

Taken as a whole it appears that social-level factors, such as family characteristics and a history of abuse, exert a stronger influence over female delinquency than male.

Despite a growing field of literature suggesting gender differences in delinquency, to date this author does not know of a gender-specific juvenile delinquency risk assessment. Rather, risk assessments tend to be gender-neutral, with both males and females receiving identical risk assessments that are scored slightly different. For example, gender is taken into account in the social history portion of the PACT, with males receiving one point based on their gender (Barnoski, 2005). Similarly, males and females receive identical versions of the RANA, however, females are not scored on the item regarding aggressive behavior (TJPC, 2009).

Empirical research supports gender-neutral assessments. Schwalbe's (2008) meta-analysis of predictive validity across gender for 19 juvenile risk assessment evaluations revealed no appreciable differences in the ability to predict risk across gender. However, failure to adequately account for gender differences in the prediction of risk could result in decreased predictive validity of a risk assessment on the female population. Although research suggests gender-neutral assessments adequately predict offending for both genders, it is necessary to further explore this hypothesis on additional risk assessments and with new populations.

Theoretical Hypothesis: Gender differences do not exist in the predictive validity of juvenile risk assessments.

Risk Assessment Research

Clinical Judgment v. Actuarial Assessments

As previously mentioned, risk assessments have evolved from practitioner judgment to statistical prediction. Empirical research supports the use of actuarial methods over clinical prediction (Grove & Meehl, 1996). In their recent meta-analysis of research comparing clinical judgment and statistical prediction, Ægisdóttir et al. (2006) concluded that statistical methods were generally more accurate than clinical prediction. This difference was most apparent when predicting violent behavior. Similarly, Schwalbe, Fraser, Day & Arnold (2004), found that actuarial instruments increased reliability of classification when compared to professional judgment. A meta-analysis of risk assessments found the criterion validity of first generation risk assessments significantly lower than actuarial assessments (Andrews, Bonta & Wormwith, 2006). In their comparison of "clinical" and "mechanical" judgment of human behaviors, Grove, Zald, Lebow, Snitz, and Nelson (2000) concluded that on average "mechanical" assessments were ten percent more accurate. Of the 136 studies they reviewed, less than six percent (n=8) of the

studies resulted in clinical judgment predicting more accurately than actuarial prediction. The remaining studies favored the actuarial method (n=64) or found the two methods to predict equivalently (n=64).

Predictive Validity of Juvenile Risk Assessments

Although risk factors are associated with an increased probability of delinquency, it is important to note that the mere presence or absence of one or more of these factors does not guarantee delinquency. As with all prediction models, incorrect classification (false positives and false negatives) do and will occur. It is imperative to validate risk assessments on the population being assessed to establish the predictive ability of the assessment, and ensure that the majority of the youth being assessed are indeed correctly classified. Gottfredson and Moriarty (2006b) stressed the importance of analyzing the predictive validity of a risk assessment through cross-validation to establish the replicability and generalizability of the assessment. They suggested “there is a danger of overestimating the extent to which relations found in one sample can be used to explain relations in a similar sample” (Gottfredson and Moriarty, 2006, p. 185).

The use of risk assessments in the criminal and juvenile justice systems to predict future offending has been demonstrated in the past decade. Schwalbe (2008) conducted a meta-analysis of 28 juvenile risk assessment tools. Area under the curve was used as the summary statistic to assess the predictive validity of the assessments included in this analysis. The average area under the curve reported for these tools was .64, with a range of .532 to .780. Third generation assessments performed slightly better than second generation tools (average AUC = .646 and .635, respectively).

Numerous other studies have compared the predictive validity of juvenile risk assessment across various offender populations and offending behaviors. These studies have produced mixed

findings, ranging from poor to excellent predictive validity depending on the risk assessment, sample and recidivism criteria employed (Thompson & Stewart, 2005). Schmidt, Campbell, and Houlding (2011) conducted a longitudinal study comparing the predictive validity of three juvenile risk assessments, YLS/CMI, SAVRY (Structured Assessment for Violence Risk in Youth), and PCL:YV. They reported moderate to large effect sizes for these tools (.66 to .79) and noted that all three tools predicted risk of male offending better than female offending. Catchpole and Gretton (2003) examined the predictive accuracy of the same three assessments for general offending of violent juvenile offenders and found AUCs ranging from .74 to .78. Jung and Rawana (1999) validated the Ministry Risk/Need Assessment Form (MRNAF), a risk assessment developed for Canadian youth, concluding that the tool predicted accurately across gender and ethnicity. A revalidation of the ARNA provided further support for the predictive validity of the instrument across gender and race/ethnicity, reporting an average AUC of .654 (Schwalbe, 2009). Meyers and Schmidt (2008) demonstrated the predictive validity of the SAVRY on a sample of 121 juvenile offenders. They found an AUC of .75 for general recidivism and .66 for violent recidivism at 12-months.

The predictive validity of certain risk assessments has been well-established through continued replication studies. For example, the predictive validity of the YLS/CMI has been documented in numerous studies across various populations (Onifade, Davidson, Campbell, Turke, Malinowski, Turner, 2008; Schmidt, Campbell & Houlding, 2011; Schmidt, Hoge & Gomes, 2005), Onifade et al. reported an AUC of .62 in their analysis of the YLS/CMI for 328 general juvenile offenders. Schmidt, Hoge, and Gomes (2005) evaluated the predictive validity of the YLS/CMI on a sample of 107 Canadian juvenile offenders referred for mental health

assessments. The instrument predicted serious reoffending (AUC=.67) better than recidivism in general (AUC=.61).

While the predictive validity of certain juvenile assessment tools has been well established in the literature, analyses of the PACT are scarce. As the results of the aforementioned studies indicate, the degree to which an assessment is able to accurately predict recidivism varies across populations. While some assessments are more valid for the general offending population, others are better suited for violent offenders. As evidenced above juvenile risk assessments have been found to be more predictive of male delinquency than female delinquency. If a risk assessment is used on the entire juvenile population it is essential to demonstrate predictive validity for both genders. As previously mentioned, Schwalbe (2008) found no evidence of gender differences in his analysis of juvenile risk assessments. When observed, gender differences in individual studies were attributed to gender biases in the juvenile justice system rather than in the risk assessment.

Bonta (2002) advises the "exercise of caution in the use of instruments that are in the early developmental stages of research" (p. 359). The predictive validity of a risk assessment cannot be solely established on one sample of the population after a handful of studies, rather it is necessary to replicate the findings across different subgroups of the population. Latessa (n.d.) suggests that a common issue with risk assessments is that the instruments are not validated, and that in order to maximize the assessment process instruments should be periodically validated with the population they are used.

Evaluation of the PACT

As previously mentioned, the PACT is primarily based upon the Washington State Juvenile Court Assessment (WSJCA). Barnoski (2004) examined the predictive validity of the

WSJCA on a sample of 20,339 pre-screen assessments. The WSJCA demonstrated moderate predictive validity with an area under the curve of .64. In addition, the 18 month recidivism rates for high risk youth (61.8%) were significantly greater than those for moderate (47.8%) and low risk (34.0%) youth.

To date, the PACT has been validated only on Florida youth. Researchers with the Justice Research Center (2006) conducted the pre-validation of the PACT. Criminal history data collected from Screening and Risk Classification Instruments (SCRI) administered between January 2002 and October 2002 were used to predict overall risk to reoffend. However, this pre-validation did not take into account the youth's social history and the risk/protective factors that could enhance his/her overall risk to reoffend included in those domains. A positive relationship between overall risk to reoffend, based entirely on criminal history, and 18-month recidivism (re-adjudication) rates was found. Youth who were categorized as low risk (43% of the sample) were less likely to be re-adjudicated (10%) in the follow-up period than moderate (32%), moderate-high (52%), and high risk youth (61%). This finding was consistent across gender, race/ethnicity, and violent offenses.

Baglivio (2009) conducted the validation of the PACT on Florida youth. Recidivism was defined as any re-referral to the Florida juvenile justice system within the 12 months following initial assessment. Although the degree to which the exclusion of adult recidivism impacted the results of this study is unknown, it is assumed that youth who aged out of the juvenile system during the follow-up period were not tracked for the full 12 months. Employing binary logistic regression as the primary analytical technique, this analysis found overall risk to reoffend score was a significant predictor of future recidivism. Low-risk youth recidivated at lower rates than youth in all other risk categories, moderate youth recidivated less often than moderate-high and

high-risk youth, etc. However, the area under the curve effect size reported in this study (.593) was low when compared to other juvenile risk assessments (Schwalbe, 2007). Baglivio (2009) found a stronger association between social history and recidivism than criminal history and recidivism. This finding is particularly pertinent due to the exclusion of social history from the pre-validation study. In addition, Baglivio (2009) reported no significant differences in the predictive validity of the PACT for males and females, finding overall risk to reoffend to be a significant predictor of male and female recidivism.

Theoretical Hypothesis: The PACT risk assessment can predict juvenile recidivism.

CHAPTER 3 METHODOLOGY

Research Questions

The proposed study will establish the construct and predictive validity of the PACT in Tarrant County. The following research questions were answered.

1. Does the PACT's overall risk to reoffend predict recidivism, with higher risk youth being more likely to recidivate?
2. What factors included in the PACT predict the likelihood that a juvenile will recidivate in the 12 months following the administration of the risk assessment?
3. Are individual-level (nature) variables or social-level (nurture) variables more predictive of recidivism?
4. How does the inclusion of neighborhood-level factors impact the predictive value of the model?
5. Are there gender-specific differences in predicting recidivism by using the PACT instrument?

General Description of Research Design

Sample Description

A PACT Pre-Screen and/or Full Assessment is completed on every juvenile who is formally referred to Tarrant County Juvenile Services (TCJS), except when the Department plans to close the case at Detention Intake and there is to be no court action. This analysis incorporates a retrospective research design in that youth included in the sample were administered their first PACT assessment between January 1, 2009 and December 31, 2009. In the first year of implementation, 3,698 youth served by TCJS received the PACT Pre-Screen and/or Full

Assessment, resulting in the administration of 6,191 assessments. Youth who were assessed and subsequently remanded to a placement facility (n=145), the Texas Youth Commission (TYC) (n=113), or certified as an adult and sentenced to prison (n=2) were excluded from the analysis, as they were not in the community during the follow-up period. Additionally, youth who did not reside in Tarrant County at the time of their assessment were removed from the analysis due to county-specific recidivism data (n=313). Finally, youth who were not between the ages of 10-17 at the time of their assessment were removed from the analysis (n=8). The final sample consists of 3,117 juveniles. To ensure an adequate follow-up period, the first PACT completed between January 1, 2009 and December 31, 2009 for each youth was included in the validation study. The final sample included data from 912 full assessments and 2205 pre-screens. As previously mentioned, overall risk to reoffend is scored identically for each assessment.

Study Variables

The dependent variables for the validation analysis were recidivism and time to recidivism. The PACT is intended to predict the risk of a youth recidivating, therefore overall risk to reoffend category should correlate with recidivism. The Office of Juvenile Justice and Delinquency Prevention (OJJDP) (2006) defines recidivism as the "repetition of criminal behavior" (p. 234). Despite being a commonly used outcome variable in juvenile and criminal justice research, there is not a standard operational definition of recidivism. In 1976, the National Advisory Committee on Criminal Justice Standards and Goals (1976) suggested that a "major problem in research on criminal justice is the absence of standardized definitions... The confusion over definitions has not only impeded communication among researchers and practitioners, but also has hindered comparisons and replications of research studies" (Harris, Lockwood, Mengers, 2009). Definitions vary in regard to the length of the follow-up period,

types of offenses included, the inclusion of adult criminal offending, and where in the system recidivism is captured. In order to draw comparisons from the present study to previous validations of the PACT and other risk assessment research, it is necessary to define recidivism in a similar manner.

The length of follow-up period used in recidivism analyses ranges from three months to five years, and sometimes even more (OJJDP, 2006). Typically, the greatest number of offenders who reoffend do so within one year with smaller percentage increases for each proceeding year (Garner, 2008; Kalist & Lee, 2009; Pate & Noreus, 2007; Pate, 2008; Pond, Watkins, Cargile & Parkhouse, 2006). OJJDP (2006) suggests that a 12-month follow-up period is standard among most states. Schwalbe (2007) found that a twelve month follow-up period is most frequently used in validating juvenile risk assessments. Eighteen of the 28 studies included in his meta-analysis utilized this follow-up timeframe. Schwalbe (2009) later employed a 12-month follow-up period in his revalidation of the ARNA. Previous validation of the PACT on the Florida population used the same follow-up period (Baglivio, 2009).

The types of offenses included in juvenile recidivism research can include conduct indicating a need for supervision, violations of supervision, class C misdemeanors, traffic violations, status offenses, and/or delinquency or criminal offenses. Similarly, a study can utilize only juvenile records or juvenile and adult records. The more offenses and records eligible for inclusion in a recidivism analysis, the higher the rate of recidivism. For example, the average recidivism rate in states that defined juvenile recidivism as incarceration for any offense in either the juvenile and criminal justice system was 25%, compared to 12% for states that defined recidivism as incarceration for delinquent offenses in the juvenile system only (OJJDP, 2006).

Finally, it is important to determine where in the system recidivism is captured, arrest/referral, adjudication/conviction, or confinement/incarceration. The earlier in the system the recidivism rate is calculated the higher the rate will be. OJJDP (2006) found the average recidivism rate for states that defined recidivism as rearrest for delinquent or criminal offenses in the juvenile or adult system was 55% compared to reconviction at 33%, and reincarceration at 24%.

For present purposes, recidivism was defined as any re-referral to Tarrant County Juvenile Services or Tarrant County Adult Criminal Courts, for a Felony or Class A or B Misdemeanor offense within 12 months following the initial PACT assessment. The PACT predicts delinquent/criminal conduct rather than status offenses or probation failure, therefore, class C misdemeanors, CINS (conduct in need of supervision) offenses, violations of probation and any referral that is generated for administrative purposes (e.g. Pending Court) were not included in the definition of recidivism. Although an overall recidivism rate for TCJS referrals is unknown, of the 5,680 formal referrals received by TCJS in 2009, 48% involved a youth who had not been previously referred to TCJS and 78% of the referrals involved a youth who did not have a prior adjudication (TJPC, 2010).

Cox regression is a type of survival analysis, and as such time to recidivism was used as the dependent variables for these analyses. The particulars of Cox regression are discussed below, but it is important to mention that this type of analyses requires the dependent variable to be a timing variable. In order to conduct a survival analysis the state, event, duration and risk period of the analysis must be defined (Vermunt & Moors, 2005). The states of the dependent variable were non-recidivist and recidivist, with associated events of no subsequent referrals and subsequent referrals. The risk period begins when the subject receives his/her initial PACT

assessment, and the duration of the risk period under analysis was 12 months. Time to recidivism was measured in days from initial assessment, ranging from 0 to 365 days. Defining the dependent variable in this manner not only accounted for who recidivated, but also provided evidence on how soon after initial assessment the youth recidivated.

The primary independent, predictor variables included in this research were those associated with risk to reoffend, such as overall risk to reoffend, social history score, record of referrals, and attitudes and behavior score. Overall risk to reoffend is a categorical variable that indicates likelihood of the youth reoffending. Risk to reoffend is determined by combining social history score and record of referral score in a scoring matrix. A youth can be considered a low, moderate, moderate-high, or a high risk to reoffend. Record of referral score ranges from 0 to 31 and captures the youths delinquency history. The record of referral considers age at first offense along with the number of misdemeanor referrals, felony referrals, weapon-related referrals, against person misdemeanor referrals, against-person felony referrals, detentions events lasting more than 48 hours, commitment orders, escapes, and warrants for failing to appear in juvenile court or absconding from supervision that the youth has in his/her juvenile record. Although the social history consists of eleven domains on the PACT Full Assessment, a limited number of social history items are included in the social history score generated by the PACT. Social history score is a continuous variable ranging from 0 to 18, with higher scores indicating a increased presence of criminogenic needs. Scoring items included in social history are school-related issues (school status, attendance, grades, and behavior), associating with anti-social peers, mental health issues, alcohol and drug use, physical and/or sexual abuse, neglect, family imprisonment, parental control, running away and/or being kicked out of the home, and out-of-home placements (see Appendix C for a complete list of study variables and operational

definitions). Finally, the PACT generates an attitude and behaviors score that ranges from 0 to 23. This six item scale measures the youth's attitudes toward laws, responsibility for behavior, beliefs on verbal and physical aggression, and violent or sexually aggressive behaviors.

The PACT includes both social-causation and social-selection items. Social-causation items are those individual-level items that are prenatal, psychological, behavioral, and mental characteristics. Individual-level predictors of recidivism included in this research were record of referral score, attitudes and behaviors score, mental health issues, alcohol and drug use and school-related issues. Social-selection items are those social-level predictors of recidivism that occur in the youth's immediate social environment. Social-level variables included in this research were associating with anti-social peers, physical and/or sexual abuse, neglect, family imprisonment, parental control, running away and/or being kicked out of the home, and out-of-home placements.

In addition to those items included in the PACT, the construct neighborhood disadvantage served as a predictor variable to determine the impact that neighborhood-level factors have on recidivism. Neighborhoods were defined geographically as census tracts. A census tract is a small subdivision of a county consisting of approximately 4,000 residents that is "designed to be homogenous with respect to population characteristics, economic status and living conditions" (U.S. Census Bureau, 2010). Census tracts were chosen as a proxy for neighborhoods because they were the smallest geographical location for which the most current census data existed. Through the use of principal component analysis, a factor regression score for neighborhood disadvantage in each Tarrant County census tract was computed. The construct of neighborhood disadvantage was defined by the percent of households living below the poverty line, percent of single-parent households, and unemployment rate for each census tract.

Data Sources

Data for this analysis was collected from several sources. The Tarrant County KIDS Database (KIDS) maintained by TCJS provided information pertaining to participant demographics, location of residence and juvenile recidivism data. Adult recidivism data for all youth who became eligible for processing in the Tarrant County Criminal Justice System during their 12-month follow-up period was collected from the Tarrant County Clerk Public Access System (TCCPAS). Both KIDS and TCCPAS are the official systems of record for the Tarrant County Juvenile Justice System and Tarrant County Criminal Justice System, respectively.

Census data was used to examine the level of disadvantage present in the youth's neighborhood. This data was collected from the 2005-2009 American Community Survey (ACS) which provides household and economic data at the census tract level. The 5-year ACS was based on data collected between January 2005 and December 2009. The 2005-2009 ACS contains the most recent data at the census tract level.

Finally, PACT data was retrieved from the PACT database maintained by TCJS in conjunction with the Tarrant County Information Technology Department. Responses to the PACT were based on official records, self-report from the juvenile, and perceptions of the probation officer. Criminal history information in Domain One of the PACT was auto-populated from KIDS, which provided uniformity in the manner in which offenses were counted and reduced the potential for human error. The remaining domains on the PACT were completed by the probation officer, after a semi-structured interview with the juvenile. In order to increase the reliability and validity of the juvenile's self-reported data, probation officers were required to make collateral contacts (e.g. access school records) to verify the accuracy of the information provided in the interview.

For the purposes of this research, the researcher was granted complete access to both the PACT and KIDS databases and all of the variables contained within. This included but was not limited to all responses to each item contained in the PACT pre-screen and full-assessment, social history and record of referral scores, overall level of risk to reoffend, assessment dates, and demographic data for each youth. Each youth had complete records, negating the need to adjust analyses for missing data.

Analytical Techniques

Principal Component Analysis

The PACT includes a scales for criminal history and social history, and produces summary statistics for these scales. In order to determine the relative influence of neighborhood-level characteristics on recidivism, principal component analysis was used to develop a scale and associated summary statistic of neighborhood disadvantage. Principal component analysis is a form of factor analysis commonly used in scale development. This method explores linear relationships among sets of variables and identifies the most parsimonious model to represent a construct. Sample size for principal component analysis is based upon the number of factors being analyzed. The suggested observations to predictor ratio is 10 to 1, with a sample size of at least 150. Inter-correlations among factors should be greater than .3, and eigenvalues greater than 1.

ROC Analysis

The predictive criterion validity of the PACT was examined. Gilner and Morgan define predictive validity as, "the extent that one can predict how a subject will do on the criterion measure in the future based on a score on the instrument to be validated" (p. 420). For present purposes, the criterion measure used to validate the PACT was 12 month recidivism. Predictive

validity was established using receiver operating characteristics (ROC) analysis. This technique has been used in medical research for many years to establish the predictive validity of diagnostic tools (Fawcett, 2006; Griner, Mayewski, Mushlin & Greenland, 1981; Metz, 1978; Obuchowski, 2005; Zweig & Campbell, 1993). More recently, ROC analysis has been extensively used in risk assessment research to examine predictive validity (Catchpole & Gretton, 2003; Lodewijks, Doreleijersm & DeRuiter, 2008; Meyers & Schmidt, 2008; Schwalbe, 2008; Viljoen, Elkovitch, Scalora & Ullman, 2009; Viljoen et al., 2008). Rice and Harris (1995) suggest "ROCs represent a major advance over methods commonly used to evaluate the accuracy of predictions of violent recidivism because they yield a measure (area under the curve) that is simultaneously independent of both selection ratio and base rate" (p. 745). Since ROC analysis does not assume an even distribution of the dependent variable, it is a particularly attractive technique in predicting recidivism, a phenomenon that is susceptible to skewed base rates. In this research, for example, 30% of the sample recidivated while the other 70% did not.

ROC analysis allows for the identification and comparison of true positives, true negatives, false positives, and false negatives. ROC analysis incorporates sensitivity and specificity to determine the predictive validity of an assessment tool. Sensitivity is the probability of a true positive and specificity is the probability of a true negative. The PACT contains four distinct risk levels: low, moderate, moderate-high, and high; with higher risk levels indicating a greater likelihood of recidivism. ROC analysis examines sensitivity and specificity for each of these risk levels.

Area under the curve (AUC) was employed as a summary measure of accuracy, the probability of correct classification, used to analyze ROC curves. According to Schwalbe (2008), "AUC is robust to variation in base rates, selection ratios, and truncated distributions- common

problems in risk assessment research" (p. 452). This process allows for the comparison of risk levels for all recidivists to non-recidivists. Each pairing is assigned a score: 1 indicates that the recidivist has a higher risk score than the non-recidivist, 0.5 indicates that the pairing is identical, and 0 indicates that the recidivist has a lower risk score than the non-recidivist. Values for AUC range from .5 to 1.0, with higher values indicating enhanced discrimination and values closer to .5 indicating that the assessment is of little value, in that it fails to discriminate between those at risk and those not at risk. Rice and Harris (1995) suggest an AUC of .60 indicates a moderate effect size and .66 a large effect size. ROC analysis was conducted with IBM SPSS 19.0 software.

Survival Analysis

Survival analysis, more specifically Cox proportional-hazards regression model was used to further explore the predictive validity of the PACT by determining which predictors contributed most to the prediction of recidivism. Similar to logistic regression, survival analysis is an analytical technique used to determine how well a model predicts a binary outcome, and which predictors in the model significantly influence the outcome. The added benefit of survival analysis is the ability to handle censored data and determine timing to an event. Censored data is a form of missing or unknown data. Bewick, Cheek and Ball (2004) suggest "survival time is described as censored when there is a follow-up time but the event has not yet occurred or is not known to have occurred" (p. 389). Cox proportional hazard model does not include censored cases, those in which the event has not occurred, in the calculation of regression coefficients. In this research, youth who have not recidivated at the end of the 12-month follow-up period were considered censored. The dependent variable in this research was censored right. The subjects included in this study were tracked for 12 months following their initial PACT

assessment, therefore it is unknown if a youth reoffended beyond the specified timeframe. Cox proportional-hazard model regression requires one dichotomous dependent variable, one timing variable indicating time to the occurrence of the dependent variable (i.e censoring time), and one or more categorical or continuous covariates (independent variables). Survival analysis was chosen in lieu of structural equation modeling due to the latter's inability to manage censored data.

As previously mentioned, Cox regression can handle both categorical and continuous covariates. In addition, this technique can accommodate time-variant, covariates that change value over the course of the censoring time, and time-constant, covariates that hold the same value of the course of the censoring time, independent variables. Since multiple assessments were not conducted on all subjects during the 12 month follow-up time, all covariates included in this research were treated as time-constant. Dichotomous independent variables were dummy coded to determine how the model changes if one category is present versus all others. Ordinal independent variables can be treated as categorical and dummy coded or as interval. Direct entry, in which all predictor variables are entered simultaneously was employed in analyses concerning variables currently used in determining overall risk to reoffend and predicting recidivism. This entry method was chosen over stepwise methods, due to the latter being more appropriate for use in exploratory analysis and data mining. Exploratory analysis assisted in the initial selection of items on the PACT and assigned scores. The current analyses represent an attempt to confirm the inclusion of such items and explore the relationship between recidivism and all predictor variables included on the PACT.

Sample size considerations for Cox regression are similar to those for logistic regression. Researchers have suggested a minimum of 10-20 cases for each independent variable included in

the model when conducting logistic regression (Harrell, Lee, Matchar & Reichert, 1985). More recently, Peduzzi, Concato, Kemper, Holford, and Feinstein (1996) found that logistic regressions with fewer than 10 events per variable were more susceptible to erroneous and inconsistent results. They went on to suggest that sample size should not only be based upon the number of independent variables in the model, but also take into account the prevalence of positive results for the dependent variable. The formula $n = 10k/p$ was used to determine suitable sample size for the Cox regressions included in this research, where k is the number of independent variables and p is the proportion of positive cases in the population.

The results of Cox regression provide information pertaining to both the overall fit of the model and the influence of each predictor in the model. The Omnibus Tests of Model Coefficients examines how well the model (set of predictors) correctly predicts the occurrence of the dependent variable in the sample. A chi-square and associated significance level less than 0.05 indicates that the model significantly increases the ability to predict the dependent variable when compared to chance.

Once the overall fit of the model is established, the Wald statistic identifies which predictor variables contribute significantly to the model. This statistic is computed by squaring the quotient of the coefficient by the standard error. A Wald statistic with an associated significance level less than 0.05 indicate that the predictor is contributing significantly to the model. The direction of the coefficients provides information regarding the type of relationship between the independent variable (X) and the dependent variable (Y). If the coefficient is negative then an increase X is associated with a decrease in Y . In contrast, a positive coefficient indicates that as X increases Y increases, or as X decreases Y decreases. Finally, the hazard ratio explains how the chance of the dependent variable occurring increases or decreases with one-unit

change in the predictor variable. The size of the hazard ratio indicates the relative contribution that each predictor variable provides in the model, with larger hazard ratios indicating greater influence.

Cox regression is a non-parametric analysis that does not make assumptions regarding the distribution of the independent variables, however independent variable should be correlated with the dependent variable. Independent variables not significantly associated with recidivism were excluded from regression analyses. There are two important assumptions of Cox regression. (1) Cox regression assumes non-informative censoring. In other words, censoring is independent of the probability of the dependent variable occurring. (2) Cox regression assumes proportional hazards, meaning that survival curves are proportional over time. For example, if the recidivism hazard for Subject A is 20% higher than Subject B at a certain point in time, this same proportion will be evident at a later point in time. This assumption can be evaluated through the inspection of log-log plots.

Empirical Hypotheses

H₁: The PACT demonstrates moderate predictive validity in the prediction of juvenile recidivism.

H₂: Social causation and social selection indicators of delinquency are significantly associated to juvenile recidivism.

H₃: Gender differences do not exist in the predictive validity of the PACT.

CHAPTER 4 RESULTS

Descriptive Statistics

The majority of the youth included in the sample (74.0%) were male. In regard to ethnicity, 37.1% of the youth were classified as White non-Hispanic, 35.0% as Black, 26.2% as Hispanic, and the remaining 1.7% as Other.² The average age at time of initial PACT assessment was 15 years (range = 10 to 17). The initial risk to reoffend distribution is presented in Table 2.

Table 2. Initial Risk to Reoffend for Youth Receiving the PACT in 2009

Risk Level	Total (n=3117)	Male (n=2308)	Female (n=809)
Low	2353 (75.5%)	1685 (73.0%)	668 (82.6%)
Moderate	451 (14.5%)	363 (15.7%)	88 (10.9%)
Moderate-High	191 (6.1%)	157 (6.8%)	34 (4.2%)
High	122 (3.9%)	103 (4.5%)	19 (2.3%)

Three-quarters of all youth were assessed as low risk on their initial PACT assessment. In addition, a greater proportion of females were assessed as low risk to reoffend (82.6%) than males (73.0%), whereas there was a greater proportion of males assessed as moderate, moderate-high and high risk when compared to females. The average record of referral score for the sample was 4.66 (range 0-21, $sd=3.13$). On average, males had higher record of referrals ($\bar{x}=4.99$, $sd=3.18$) when compared to females ($\bar{x}=3.73$, $sd=2.77$). Social history scores averaged slightly higher at 4.94 (range 0-16, $sd=3.16$). As was the case with record of referral, the average social history score for the male sample ($\bar{x}=5.17$, $sd=3.07$) was higher than the female sample ($\bar{x}=4.30$, $sd=3.31$). When applied to the scoring matrix, a youth with "average" record of referral and social history scores would be considered a low risk to reoffend. Attitude and behavior scores averaged 3.09 (range 0-13, $sd=2.86$). There was a smaller discrepancy between the average attitude and behavior score for male and female subjects. Males averaged

² The descriptive analysis was conducted with IBM SPSS 19.0.

3.05 ($sd=2.83$), and females were slightly higher with an average of 3.20 ($sd=2.94$). Finally, the average neighborhood of disadvantage score for the sample was 0.19 (range -1.70 to 4.47, $sd=0.98$). Descriptive statistics for all predictor items included in the PACT record of referral (see Table 3), social history (see Table 4), and attitudes and behaviors subscales (see Table 5) are presented below for the entire sample, male-only sample, and female-only sample. Descriptive statistics by gender for the total sample are presented in Appendix D.

A review of item responses revealed that males were more likely to have reported negative responses than females. Against-person misdemeanors was the only record of referral item where females were significantly more likely than males to have documented criminal history (z -score: 3.73, $p<.001$). The proportion of males with a documented history of misdemeanors (z -score: 3.78, $p<.001$), felonies (z -score: 12.22, $p<.001$), and against-person felonies (z -score: 4.64, $p<.001$) was significantly greater than the proportion of females displaying these same characteristics. Four record of referral items were rare events in Tarrant County. Less than 5% of all subjects reported a history of weapons-referrals, commitments, escapes, and/or warrants. In regard to social history, males were significantly more likely than females to report school-related issues (z -score:3.62, $p<.001$), drug and/or alcohol use (z -score:3.97, $p<.001$), and gang involvement (z -score:3.87, $p<.001$). In contrast, females were more likely to report a history of physical and/or sexual abuse (z -score:7.93, $p<.001$) and history of running away or being kicked out (z -score: 8.44, $p<.001$). For attitudes and behaviors, females were more likely than males to report acceptance of verbal aggression (z -score: 3.60, $p<.001$) and a history of violence (z -score: 3.19, $p=.001$). Males were more likely than females to display a negative attitude toward law abiding behavior (z -score: 2.00, $p<.045$).

Table 3. Record of Referral Predictor Variable Frequencies for Total Sample, Male-only Sample, and Female-only Sample

Predictor Variable	Frequency (%)		
	Entire Sample	Female-Only Sample	Male-Only Sample
Age at First Offense			
None/Over 16	114 (3.7%)	66 (8.2%)	48 (2.1%)
16	663 (21.3%)	178 (22.0%)	485 (21.0%)
15	658 (21.1%)	191 (23.6%)	467 (20.2%)
13 to 14	1131 (36.3%)	280 (34.6%)	851 (36.9%)
Under 13	551 (17.7%)	94 (11.6%)	457 (19.8%)
Misdemeanor Referrals			
None or one	2544 (81.6%)	694 (85.8%)	1850 (80.2%)
Two	401 (12.9%)	82 (10.1%)	319 (13.8%)
Three or Four	154 (4.9%)	28 (3.5%)	126 (5.5%)
Five or more	18 (0.6%)	5 (0.6%)	13 (0.6%)
Felony Referrals			
None	1807 (58.0%)	604 (74.7%)	1203 (52.1%)
One	1101 (35.3%)	190 (23.5%)	911 (39.5%)
Two	178 (5.7%)	12 (1.6%)	165 (7.1%)
Three or more	31 (1.0%)	2 (0.2%)	29 (1.3%)
Weapon Referrals			
None	2991 (96.0%)	800 (98.9%)	2191 (94.9%)
One or more	126 (4.0%)	9 (1.1%)	117 (5.1%)
Against-person Misdemeanor Referrals			
None	2357 (75.6%)	571 (70.6%)	1786 (77.4%)
One	678 (21.8%)	209 (25.8%)	469 (20.3%)
Two or more	82 (2.6%)	29 (3.6%)	53 (2.3%)
Against-person Felony Referrals			
None	2592 (83.2%)	712 (88.0%)	1880 (81.5%)
One or two	523 (16.8%)	96 (11.9%)	427 (18.5%)
Three or more	2 (0.1%)	1 (0.1%)	1 (0.0%)
Confinements exceeding 48 hours			
None	2624 (84.2%)	727 (89.9%)	1897 (82.2%)
One	269 (8.6%)	47 (5.8%)	222 (9.6%)
Two	114 (3.7%)	21 (2.6%)	93 (4.0%)
Three or more	110 (3.5%)	14 (1.7%)	96 (4.2%)
Commitment Orders			
None	3098 (99.4%)	806 (99.6%)	2292 (99.3%)
One	17 (0.5%)	2 (0.2%)	15 (0.6%)
Two or more	2 (0.1%)	1 (0.1%)	1 (0.0%)
Escapes			
None	3115 (99.9%)	808 (99.9%)	2307 (100.0%)
One	2 (0.1%)	1 (0.1%)	1 (0.0%)
Two or more	0 (0.0%)	0 (0.0%)	0 (0.0%)
Warrants			
None	2997 (96.2%)	790 (97.7%)	2207 (95.6%)
One	82 (2.6%)	14 (1.7%)	68 (2.9%)
Two or more	38 (1.2%)	5 (0.6%)	33 (1.4%)

Table 4. Social History Predictor Variable Frequencies for Entire Sample, Female-only Sample, and Male-only Sample

Predictor Variable	Frequency (%)		
	Entire Sample	Female-Only Sample	Male-Only Sample
Gender			
	Male	2308 (74.0%)	
	Female	809 (26.0%)	
School Issues			
	None	1093 (35.1%)	327 (40.4%)
	Enrolled with some issues relating to grades, attendance and/or conduct	1049 (33.7%)	244 (30.2%)
	Enrolled with major issues relating to grades, attendance and/or conduct or Dropped out, expelled, or suspended	975 (31.3%)	238 (29.4%)
			766 (33.2%)
			805 (34.9%)
			737 (31.9%)
Drug/Alcohol Use			
	No	2079 (66.7%)	584 (72.2%)
	Yes	1038 (33.3%)	225 (27.8%)
			1495 (64.8%)
			813 (35.2%)
Mental Health Issues			
	No	2640 (84.7%)	668 (82.6%)
	Yes	477 (15.3%)	141 (17.4%)
			1972 (85.4%)
			336 (14.6%)
Physical/Sexual Abuse			
	No	2603 (83.5%)	595 (73.5%)
	Yes	514 (16.5%)	214 (26.5%)
			2008 (87.0%)
			300 (13.0%)
Neglect			
	No	2976 (95.5%)	767 (94.8%)
	Yes	141 (4.5%)	42 (5.2%)
			2209 (95.7%)
			99 (4.3%)
Peers			
	Pro-social friends ONLY	1064 (34.1%)	304 (37.6%)
	Mix or No friends	1350 (43.3%)	359 (44.4%)
	Anti-social friends	257 (8.2%)	61 (7.5%)
	Gang member/associate	446 (14.3%)	85 (10.5%)
			760 (32.9%)
			991 (42.9%)
			196 (8.5%)
			361 (15.6%)
Incarceration of Household Member			
	No	2218 (71.2%)	571 (70.6%)
	Yes	899 (28.8%)	238 (29.4%)
			1647 (71.4%)
			661 (28.6%)
Parental Control			
	Usually obeys and follows rules	1646 (52.8%)	417 (51.5%)
	Sometimes obeys	1131 (36.3%)	286 (35.4%)
	Consistently disobeys	340 (10.9%)	106 (13.1%)
			1229 (53.2%)
			845 (36.6%)
			234 (10.1%)
History of Running Away			
	No runaway history	2167 (69.5%)	463 (57.2%)
	1 runaway	365 (11.7%)	115 (14.2%)
	2 or more runaways	585 (18.8%)	231 (28.6%)
			1704 (73.8%)
			250 (10.8%)
			354 (15.3%)
Placements			
	No placements	2889 (92.7%)	737 (91.1%)
	1 or more placement	228 (7.3%)	72 (8.9%)
			2152 (93.2%)
			156 (6.8%)

Table 5. Attitude and Behavior Predictor Variable Frequencies for Entire Sample, Female-only Sample, and male-only Sample

Predictor Variable	Frequency (%)		
	Entire Sample	Female-Only Sample	Male-Only Sample
Attitude toward law-abiding behavior			
Abides by conventions	1818 (58.3%)	496 (61.3%)	1322 (57.3%)
Believes conventions sometime apply	1077 (34.6%)	258 (31.9%)	819 (35.5%)
Does not believe conventions apply	122 (3.9%)	27 (3.3%)	95 (4.1%)
Resents responsible behavior	100 (3.2%)	28 (3.5%)	72 (3.1%)
Responsibility for anti-social behavior			
Accepts responsibility	1990 (63.8%)	538 (66.5%)	1452 (62.9%)
Minimizes, denies, or justifies	978 (31.4%)	240 (29.7%)	738 (32.0%)
Accepts anti-social behavior as okay	114 (3.7%)	25 (3.1%)	89 (3.9%)
Proud of anti-social behavior	35 (1.1%)	6 (0.7%)	29 (1.3%)
Verbal Aggression			
Rarely appropriate	1506 (48.3%)	347 (42.9%)	1159 (50.2%)
Sometimes appropriate	1183 (38.0%)	295 (36.5%)	888 (38.5%)
Often appropriate	428 (13.7%)	167 (20.6%)	261 (11.3%)
Physical Aggression			
Never appropriate	1375 (44.1%)	369 (45.6%)	1006 (43.6%)
Rarely appropriate	736 (23.6%)	184 (22.7%)	552 (23.9%)
Sometimes appropriate	795 (25.5%)	200 (24.7%)	595 (25.8%)
Often appropriate	211 (6.8%)	56 (6.9%)	155 (6.7%)
Evidence of violence			
None	2037 (65.4%)	491 (60.7%)	1546 (67.0%)
One	533 (17.1%)	145 (17.9%)	388 (16.8%)
Two or more	547 (17.5%)	173 (21.4%)	374 (16.2%)
Evidence of sexual aggression			
None	3060 (98.2%)	802 (99.1%)	2258 (97.8%)
One	37 (1.2%)	3 (0.4%)	34 (1.5%)
Two or more	20 (0.6%)	4 (0.5%)	16 (0.7%)

Recidivism Analysis

Approximately 30% of the youth in the sample recidivated in the twelve months following their initial PACT assessment. Females recidivated at a lower rate (17.6%) when compared to males (34.2%). As seen in Table 7, the proportion of youth who recidivated increased as risk level increased. While less than one-quarter of the low risk youth recidivated, more than half of the high risk youth recidivated.

Table 6. Twelve Month Recidivism by Risk Level

Risk Level	Recidivism		Total
	No	Yes	
Low	1786 (75.9%)	567 (24.1%)	2353
Moderate	248 (55.0%)	204 (45.0%)	451
Moderate-High	97 (50.8%)	93 (49.2%)	191
High	54 (44.3%)	70 (55.7%)	122
Total	2185 (70.1%)	932 (29.9%)	3117

Chi-square analysis confirmed these findings. A 4x2 chi-square revealed a significant association between risk to reoffend and recidivism ($\chi^2=159.79$, $df=3$, $p<0.00$). There appeared to be a positive relationship between risk to reoffend and recidivism, with higher risk youth more likely to recidivate. Chi-square analyses produced similar findings with males ($\chi^2=111.07$, $df=3$, $p<0.00$) and females ($\chi^2=30.56$, $df=3$, $p<0.00$).

Post hoc analysis examining the standardized residuals of the expected cell counts revealed a significant difference between low risk and all other risk level. While the expected count for low risk youth who recidivated was significantly less than the observed count (z -score=-5.1), the expected count for moderate, moderate-high, and high risk youth who recidivated was significantly greater than the observed count (z -score=5.9, z -score=4.9, and z -score=5.2, respectively).

Principal Component Analysis

Principal component analysis was used to determine the degree to which percentage of individuals at or below the poverty level, percentage of single-parent households, and percentage of individuals unemployed account for the variance in neighborhood disadvantage across all census tracts in Tarrant County (n=310). This analysis revealed that all three variables load strongly on a single factor (eigenvalue = 2.142), which accounted for 71.34% of the variance across census tracts. All factor loadings were greater than 0.8 (see Table 8).

Table 7. Factor Loadings for Neighborhood Disadvantage Construct

Indicator	Factor Loading
Below Poverty Line	0.877
Single-parent households	0.840
Unemployed	0.817

A factor regression score was computed to provide a composite measure that indicated the degree to which a neighborhood was characterized by disadvantage. Factor regression scores for neighborhood disadvantage for all census tracts in Tarrant County ranged from -1.74 to 4.47 ($\bar{x}=0.00$, $sd=1.00$), with higher scores indicating greater disadvantage.

ROC Analysis

The AUC for the entire sample was 0.607 (95% CI = .585 to .630), which is statistically significant with a p -value less than .001. Likewise, the AUCs for the male-only (AUC=.604) and female-only (AUC=.596) samples were significant with p -value less than .001. The AUC for the male-only sample was slightly higher than the female-only sample, suggesting the PACT is slightly more predictive of male reoffending.

Table 8. Area Under the Curve for all Samples

	AUC	S.E.	p-value	95% Confidence Interval
Total Sample	.607	.011	.000	.585-.630
Male-only	.604	.013	.000	.579-.629
Female-only	.596	.028	.000	.541-.651

Although the AUCs found in this analysis were lower than the average found by Schwalbe (2008), they are higher than those found in the validation of the PACT assessment on the Florida juvenile population (Baglivio, 2009). When compared to the criteria specified by Rice and Harris (1995), the PACT appeared to have moderate predictive validity for the total and male-only sample. However, the PACT demonstrated poor predictive validity for the female-only sample.

Table 9. Sensitivity and Specificity of PACT for Full, Male-only, and Female-only Samples

Cut-Off Value	Full Sample Sensitivity	Full Sample Specificity	Male Sample Sensitivity	Male Sample Specificity	Female Sample Sensitivity	Female Sample Specificity
0.0	100.00	0.00	100.00	0.00	100.00	0.00
>1	39.16	81.74	40.25	79.91	33.10	85.91
>2	17.38	93.09	18.10	92.29	13.38	94.90
>3	7.30	97.53	7.59	97.17	5.63	98.35
>4	0.00	100.00	0.00	100.00	0.00	100.00

Sensitivity and specificity estimates are presented in Table 9 for the entire sample, male-only sample, and female-only sample. For all samples, a cut-point of >1 provided the greatest degree of sensitivity. At this cut-point youth classified as moderate, moderate-high, and high risk were identified as recidivists, resulting in the correct classification of approximately 40% of the youth who recidivated. In regard to specificity, approximately 20% of the subjects at this cut-point were false positives (youth who were identified as a recidivist who did not recidivate). As

the cut-points increased the sensitivity of the PACT decreased significantly, whereas there were modest improvements in specificity. For example, a cut-point of >3 classified only high risk youth a recidivist, reducing the accuracy of identifying recidivists to 7.3%.

Survival Analysis

Overall Risk to Reoffend

While ROC analysis was used to determine the predictive validity of the overall risk to reoffend, survival analysis was employed to further explore the predictive validity, examine the relationships between predictors of recidivism included in the PACT and others supported by empirical research, and understand which contributing factors were most predictive of recidivism. Several Cox proportional-hazards models were created to provide a more complete understanding of the various factors impacting recidivism.

Table 10. Cox Regression using Overall Risk to Reoffend as the Predictor Variable

Predictor	B	S.E.	Wald	df	p-value	Hazard Ratio
Risk to Reoffend (Low)	-.268	.129	4.335	1	.037	.765
Risk to Reoffend (Moderate)	-.184	.140	1.715	1	.190	.832
Risk to Reoffend (Moderate-High)	.056	.159	.122	1	.727	1.057
Risk to Reoffend (High)			11.424	3	.010	

* High risk to reoffend was used as a reference category for the Cox regression.

Using the categorical overall risk to reoffend as the only predictor variables in the model, Cox regression analysis was used to determine if overall risk to reoffend was a significant predictor of recidivism. Overall risk to reoffend was a significant predictor of future recidivism ($\chi^2=11.424$ $df=3$, $p=.01$). The reference category for risk to reoffend was high risk, to which the three other risk levels were compared. A significant difference in recidivism hazard was not observed between high and moderate and high and moderate-high risk youth. This finding is

further supported by the survival curve below (see Figure 2). As seen in the survival curve, the curves for high and moderate-high are relatively similar. While there is a more pronounced difference in the survival curves for high risk and moderate risk youth, this difference is not significant. There was a significant difference between high risk and low risk youth (Wald test $\chi^2 = 4.335$, $p = .037$). The hazard for low risk youth was .765 times less than that of high risk youth, suggesting a youth who is a low risk to reoffend was 23.5% less likely than a high risk youth to reoffend.

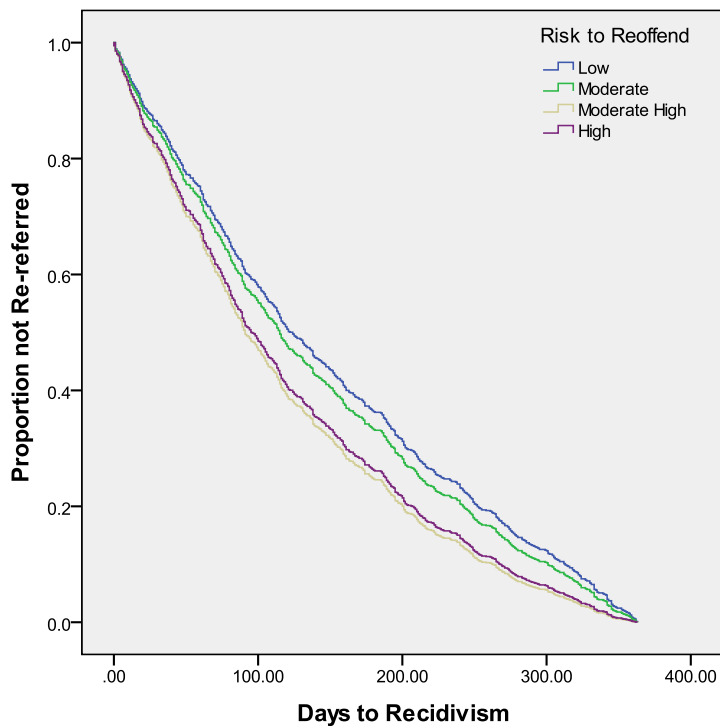


Figure 2. Survival Curve for Days to Recidivism by Overall Risk to Reoffend

Of the youth who recidivated, more than half (51.9%) did so within the first 120 days following assessment. The survival curves for low and moderate risk youth were nearly identical during the first two months or 60 days following initial assessment. After 60 days, the gap between low and moderate risk youth began to expand, with a greater proportion of moderate

youth recidivating sooner than low risk youth. While the survival curves for high risk and moderate-high risk curves are nearly identical, moderate-high risk youth recidivated quicker than high risk youth. As indicated by their shorter survival curves, high and moderate-high risk youth were more likely to recidivate sooner than moderate and low risk youth (see Figure 2).

Table 11. Cox Regression by Gender using Overall Risk to Reoffend as the Predictor Variable

Gender	-2 Log Likelihood	χ^2	df	p-value
Male	8972.199	8.865	3	.031
Female	1130.243	2.699	3	.440

ROC analysis suggested a difference in the predictive validity of the PACT for male and female subjects. Separate Cox regressions for males and females revealed that overall risk to reoffend is not a significant predictor of female reoffending (p=.44). Females in all risk levels recidivated at similar times despite their overall risk to reoffend. In contrast, overall risk to reoffend was a significant predictor of male recidivism (p=.031). Similar to the findings for the entire sample, there was only a significant difference between the timing of recidivism for high risk and low risk youth (Wald test $\chi^2 = 2.841$, p = .092) at the .10 significance level, with the hazard for low risk youth being 20.7% less than high risk youth.

Record of Referral and Social History

As previously mentioned, the PACT's overall risk to reoffend score is determined by the youth's record of referral and social history scores. The second model used record of referral and social history score to predict recidivism. The overall model was significant at the .01 level ($\chi^2=12.886$, $df=2$, $p=0.02$). Further inspection of the covariates included in the model revealed that record of referral score was not significantly associated with recidivism (Wald test $\chi^2 = 1.416$, $p = .234$). Social history score was a significant covariate of recidivism (Wald test $\chi^2 =$

9.905, $p = .002$), with each one point increase in social history representing a 3.4% increase in recidivism hazard.

Table 12. Cox Regression using Record of Referral and Social History Scores as Predictors

Predictor	B	S.E.	Wald	<i>df</i>	p-value	Hazard ratio
Record of Referral Score	.011	.009	1.416	1	.234	1.011
Social History Score	.033	.011	9.905	1	.002	1.034

Similar to the findings for the model including overall risk to reoffend, this model was significant for males ($\chi^2=8.054$, $df=2$, $p=.002$). Closer examination of the predictors included in the model revealed that record of referral score was not significantly associated with male recidivism (Wald test $\chi^2 = .364$, $p = .546$). However, there was a positive and significant association between social history score and time to reoffense. With a one-point increase in social history score representing a 3.1% increase in the recidivism hazard for male subjects (Wald test $\chi^2 = 6.896$, $p = .009$).

The results of this model for predicting female recidivism was improved over the initial model using risk to reoffend. This model was significant at the .1 level ($\chi^2=4.828$, $df=2$, $p=0.09$). Similar to their male counterparts, social history score was a significant predictor of recidivism at the .1 level (Wald test $\chi^2 = 2.930$, $p = .087$), and record of referral score failed to attain significance (Wald test $\chi^2 = 1.752$, $p = .186$)

Predictors of Record of Referral

Although record of referral score did not reach significance in the previous model, the individual indicators of record of referral were inspected to determine which, if any, of them were significantly associated with recidivism. An initial inspection of the bivariate correlations

revealed that the majority of the indicators of record of referral were significantly correlated with recidivism at the .05 or .01 level. The number of escapes ($r=-.017$), against person felonies ($r=.009$) weapon-related referrals ($r=.008$) a youth had were not significantly associated to recidivism. This finding is most likely attributed to the fact that escapes, against-person felonies, and weapon-related referrals are a rare event in Tarrant County. For example, only two youth in the sample had a documented escape. Due to this finding, these indicators were removed from the regression model. The results of the Cox regression appear below.

Table 13. Cox Regression with Indicators of Record of Referral as Predictors of Recidivism

	-2 Log Likelihood	χ^2	<i>Df</i>	p-value
Total	10895.706	6.621	7	.469
Male-only	8974.056	6.767	7	.454
Female-only	1125.092	7.555	7	.373

The overall model or the entire sample was not significant ($\chi^2=6.621$, $df=7$, $p=0.47$). In addition the model was not significant for the male-only ($\chi^2=6.767$, $df=7$, $p=0.45$), or female-only sample ($\chi^2=7.555$, $df=2$, $p=0.38$). An examination of the individual predictor variables included in the model revealed that none were significant at the .1 level for the total sample, male-only sample, or female-only sample. In sum, none of the indicators of record of referral were significantly associated with future offending.

Predictors of Social History

The previous finding that social history score was significantly associated with recidivism for the entire sample, as well as the male-only and female-only sample, provided the impetus to further explore the relationships between the indicators of social history score and recidivism. Bivariate correlations revealed that all indicators except a history of placements ($r=.026$) were significantly associated with recidivism. As such, history of placements was

removed from the model. The overall model was significantly associated with recidivism for the entire sample ($\chi^2=18.095$, $df=9$, $p=.034$) and male-only sample ($\chi^2=18.648$, $df=9$, $p=.028$) at the .05 significance level. The model was significantly associated with female reoffending at the .1 level ($\chi^2=16.584$, $df=9$, $p=.056$).

Table 14. Cox Regression with Indicators of Social History as Predictors of Recidivism for Male-only Sample

Predictor	B	S.E.	Wald	df	p-value	Hazard ratio
School Issues	.043	.053	.669	1	.413	1.044
Peers	-.023	.039	.362	1	.548	.977
History of Running Away	.139	.046	9.095	1	.003	1.149
Family Imprisonment	.137	.078	3.105	1	.078	1.147
Parental Control	.007	.063	.012	1	.912	1.007
Alcohol/Drug Use	.075	.079	.906	1	.341	1.078
Physical/Sexual Abuse	-.010	.102	.010	1	.922	.990
Mental Health Issues	-.070	.102	.478	1	.489	.932
Neglect	-.016	.074	.049	1	.824	.984

Closer inspection of the variables included in the model revealed differences in the significant predictors of male and female recidivism (see Table 14 and Table 15). For each gender, two of the nine predictors were significant at the .1 level. For the male-only sample, a history of running away (Wald test $\chi^2 = 9.095$, $p = .003$) and history of imprisonment of household members currently involved with the family (Wald test $\chi^2 = 3.105$, $p = .078$), were positively and significantly associated with male recidivism. For every increase in incidents of running away or being kicked out of the house males were 14.9% more likely to recidivate. Likewise, a male delinquent with an incarcerated or formerly incarcerated household member was 14.7% more likely than a male delinquent without an incarcerated or formerly incarcerated household member to reoffend.

Table 15. Cox Regression with Indicators of Social History as Predictors of Recidivism for Female-only Sample

Predictor	B	S.E.	Wald	df	p-value	Hazard ratio
School Issues	.025	.124	.041	1	.840	1.025
Peers	-.092	.096	.931	1	.335	.912
History of Running Away	.158	.106	2.211	1	.137	1.171
Family Imprisonment	-.118	.188	.395	1	.530	.888
Parental Control	.348	.141	6.118	1	.013	1.416
Alcohol/Drug Use	-.095	.187	.256	1	.613	.910
Physical/Sexual Abuse	-.010	.202	.002	1	.962	.990
Mental Health Issues	.216	.203	1.137	1	.286	1.242
Neglect	.290	.143	4.126	1	.042	1.337

In regard to female recidivism, parental control (Wald test $\chi^2 = 6.118$, $p = .013$) and a history of neglect (Wald test $\chi^2 = 4.126$, $p = .042$) were significant indicators at the .05 level. Parental control exhibited the strongest relationship to female reoffending. The hazard ratio for parental control was 1.416, suggesting that for every increase in parental control score (with a higher score indicating less parental control) a female delinquent is 41.6% more likely to reoffend. In addition, females who had a history of neglect were 33.7% more likely to reoffend than females without a history of neglect.

Individual-level, Social-level and Community-level Predictors

The analyses above serve to validate the PACT and explore the relationships between variables included in determining overall risk to reoffend contained in the PACT and recidivism. As previously mentioned, the PACT excludes variables related to anti-social attitudes and behaviors and community-level variables, despite empirical research suggesting they play a role in recidivism. This final model explored the relationship between individual-level, social-level, and community-level predictors and recidivism. Individual-level predictors included in the

model were record of referral score, attitudes and behavior score, school issues, alcohol and drug use, and mental health issues. Social-level variables included in the model were peers, family imprisonment, parental control, history of running away, history of sexual and/or physical abuse, and a history of neglect. The summary measure for neighborhood disadvantage served as the community-level predictor.

Bivariate correlations confirmed a significant relationship between recidivism and each of the predictors included in the model. Furthermore, none of the predictor variables were highly correlated with one another. The overall model did not achieve statistical significance at the .05 level for any of the samples. However, all models were significant at the .1 level (entire sample: $\chi^2=20.476$, $df=12$, $p=0.059$; male-only sample: $\chi^2=19.977$, $df=12$, $p=0.068$; female-only sample: $\chi^2=20.114$, $df=12$, $p=0.065$).

Table 16. Cox Regression for Male-only Sample using Record of Referral, Social History and Neighborhood Disadvantage as Predictors

Predictor	B	S.E.	Wald	df	p-value	Hazard ratio
Individual-Level						
Record of Referral Score	.009	.010	.768	1	.381	1.009
Attitudes and Behavior Score	-.006	.016	.147	1	.701	.994
School Issues	.045	.053	.714	1	.398	1.046
Alcohol and Drug Use	.085	.079	1.135	1	.287	1.088
Mental Health	-.074	.105	.497	1	.481	.929
Social-Level						
Peers	-.027	.040	.439	1	.508	.974
Family Imprisonment	.129	.079	2.661	1	.103	1.137
Parental Control	.012	.068	.032	1	.858	1.012
Running Away	.144	.047	9.459	1	.002	1.155
Abuse	-.015	.103	.021	1	.886	.985
Neglect	-.015	.074	.040	1	.842	.985
Community-Level						
Neighborhood Disadvantage	.025	.040	.398	1	.528	1.026

When individual, social, and community-level summary score indicators of recidivism were entered into the same model, it was social-level factors that has the strongest relationship with recidivism for both male and female juveniles. Inspection of the variables included in the model revealed that the majority of the indicators were not significantly associated with recidivism in the male-only sample. Of the twelve indicators included in the model, a history of running away or being kicked out was the only significant predictor at the .05 level (Wald test $\chi^2 = 9.459$, $p = .002$). For every incident of running away or being kicked out, the recidivism hazard for male subjects increased by 15.5%. The inclusion of additional individual-level and community-level factors not only reduced the overall significance of the model fit, it also decreased the strength of relationship between male recidivism and family imprisonment (Wald test $\chi^2 = 2.661$, $p = .103$).

Table 17 Cox Regression for Female-only Sample using Record of Referral, Social History and Neighborhood Disadvantage as Predictors

Predictor	B	S.E.	Wald	<i>df</i>	p-value	Hazard ratio
Individual-Level						
Record of Referral Score	.024	.027	.825	1	.364	1.025
Attitudes and Behavior Score	.025	.034	.546	1	.460	1.026
School Issues	.027	.125	.046	1	.831	1.027
Alcohol and Drug Use	-.147	.193	.577	1	.447	.863
Mental Health	.096	.223	.186	1	.666	1.101
Social-Level						
Peers	-.074	.100	.549	1	.459	.929
Family Imprisonment	-.116	.194	.356	1	.551	.890
Parental Control	.309	.154	4.039	1	.044	1.362
Running Away	.148	.110	1.790	1	.181	1.159
Abuse	.028	.202	.020	1	.888	1.029
Neglect	.272	.144	3.574	1	.059	1.312
Community-Level						
Neighborhood Disadvantage	-.142	.096	2.191	1	.139	.867

Examination of the predictors of recidivism for the female-only sample revealed two significant associations at the .1 level: parental control and neglect. The strongest association was between parental control and recidivism. The less control a parent had over his/her daughter, the more likely she was to recidivate (Wald test $\chi^2 = 4.039$, $p = .044$). For every increase in parental control score, the recidivism hazard increased 36.2%. In addition, female subjects with a history of neglect were 31.2% more likely than female subjects without a history of neglect to recidivate (Wald test $\chi^2 = 3.574$, $p = .059$). Again the strength of the relationship between these variables and recidivism decreased with the addition of individual-level and community-level variables.

CHAPTER 5 DISCUSSION

Findings

H₁: The PACT demonstrates moderate predictive validity in the prediction of juvenile recidivism.

The primary purpose of the PACT is to determine a youth's risk to reoffend, which is intended to inform dispositional and related case management decisions. The PACT's overall risk to reoffend was predictive of future recidivism, and Hypothesis 1 accepted. As a youth's overall risk to reoffend increased so did his/her chances of recidivating. This finding was evidenced in the recidivism analysis, ROC analysis, and Cox regression.

The recidivism analysis revealed that approximately 30% of the youth in the sample reoffended within the 12 months following their initial assessment. Of the youth who recidivated, a higher proportion of high risk youth recidivated than all other risk levels, followed by moderate-high, moderate, and low risk youth. At each risk level the recidivism rate was greater than the recidivism rate for the preceding risk level.

As indicated by the ROC analysis, the PACT demonstrated moderate predictive validity for the entire sample when using the guidelines set forth by Rice and Harris (1995). It should be mentioned that the area under the curve reported in this analysis for the entire sample (.607) was on the lower end for being considered moderate predictive validity (.60 to .65). In comparison to prior research on the PACT, the results from the Tarrant County sample revealed greater predictive validity. The PACT demonstrated poor predictive validity for the Florida juvenile population with a reported area under the curve of .593 for 12 month recidivism (Baglivio, 2009). This finding was lower than all area under the curves reported for Tarrant County youth. Despite producing favorable results for the predictive validity of the PACT, the area under the

curve found in this analysis was lower than the average area under the curve (.64) reported in Schwalbe's (2008) meta-analysis of juvenile risk assessments. Schwalbe (2008) reported higher area under the curve for third-generation risk assessments than second generation risk assessments. As a fourth-generation risk assessment, the PACT performed worse than the average second-generation risk assessment (.635). Furthermore, the predictive validity of the PACT for Tarrant County youth, was less than the .64 area under the curve for the PACT's predecessor, the WSJCA, reported by Barnoski (2004). In sum, despite a finding of moderate predictive validity, when compared to other assessments, the PACT is less accurate in correctly classifying recidivists and non-recidivists.

Interestingly, the cut point generating the highest degree of sensitivity was >1 . At this cut point youth identified as moderate, moderate-high, an high risk are categorized as recidivists, and 40% of youth who recidivated were identified as such. This finding could be attributed to the number of youth identified as moderate, moderate-high, and high risk. Approximately three-quarters of the youth in Tarrant County were identified as low risk, reducing the heterogeneity of risk for the entire sample. In contrast, less than half (43%) of the initial sample used in the pre-validation of the PACT was classified as low risk. Perhaps, PACT results in Tarrant County should be treated as dichotomous rather than categorical. While less than a quarter of low risk youth reoffended in the 12 month follow-up period, nearly half of moderate and moderate-high risk youth and more than half of the high risk youth recidivated. Policymakers within TCJS should consider using the >1 cut-point when determining the provision of supervision and services. As the risk principle purports, supervision and related services should correspond with the risk the youth poses to the community. With low risk youth recidivating at low rate, providing scarce resources to these youth would be less effective and potentially more harmful

than good. Considering youth identified as moderate, moderate-high, and high risk as potential candidates for supervision and services would serve to help lower recidivism rates across the Tarrant County juvenile population.

Finally, the Cox regression analysis using overall risk to reoffend as the predictor variable revealed a significant relationship between risk level and recidivism. More than half of youth who recidivated did so within the first four months following assessment. For the most part, as risk to reoffend increased the amount of time to recidivism decreased. For example, moderate risk youth recidivated slightly sooner than low risk youth, and moderate-high and high-risk youth recidivated significantly sooner than low risk youth. Of the youth who recidivated, within the first 100 days following assessment approximately half of all moderate-high and high risk youth were re-referred compared to approximately 125 days for moderate risk youth and 150 days for low risk youth. Of all risk levels, moderate-high risk youth recidivated within the shortest amount of time following initial assessment. Not only did overall risk to reoffend predict recidivism, it also predicted the timing of recidivism with higher risk youth reoffending within a shorter time frame than moderate and low risk youth. Understanding the timing of recidivism serves to further inform decisions made regarding detainment, disposition, and programming. Perhaps timelines for engaging high risk youth in programs aimed at curtailing their criminogenic needs should be more stringent than those for lower risk youth.

H₂: Social causation and social selection indicators of delinquency are significantly associated to juvenile recidivism.

Despite research supporting both social selection and social causation, when individual-level, social-level, and community-level indicators of recidivism were loaded into a single model, only social-level (social causation) indicators were significant predictors of recidivism for

both males and females. Nurture rather than nature played a bigger role in the prediction of juvenile recidivism. More specifically, indicators of social bonding and social control contributed most to the prediction of both male and female delinquency. Significant social-level indicators for males were a history of household member incarceration and a history of running away or being kicked out. Significant social-level indicators for females were a history of neglect and parental control.

The inclusion of a community-level predictor of recidivism did not enhance the ability to correctly classify a youth as a recidivist or non-recidivist. The addition of the community-level indicator to account for neighborhood of disadvantage ($p=.059$), did not improve the overall model fit when compared to the model that included only individual-level and social-level predictors ($p=.002$). This finding provides evidence that the exclusion of community-level variables from the PACT does not impact the accuracy of the instrument to classify youth into risk level. Furthermore, this finding suggests that the PACT has broad application in juvenile justice. Since community-specific variables were not significant in the prediction of recidivism, the PACT, using personal and social indicators, could be applied to various jurisdictions. While this finding does not negate the need to further validate the assessment on additional jurisdictions that implement the PACT, evidence suggests that community-level differences should not impact the predictive validity of the instrument across jurisdictions.

While overall risk to reoffend was a significant predictor of recidivism, the two scores creating overall risk to reoffend produced slightly different results. Consistent with prior research on the PACT, social history score was more predictive of future offending than record of referral score. A youth's social history score was a significant predictor of recidivism, with higher scores indicating an increased chance of recidivism. Since the social history portion of the PACT is

where criminogenic needs are assessed, this finding is particularly important to program decisions. If criminogenic needs (social history) are significantly related to recidivism, then services and programming targeting those needs should in turn lead to a reduction in recidivism.

In contrast to the plethora of literature suggesting that prior criminal history is the greatest predictor of future criminal history (Bonta, Law & Hanson, 1998; Cottle, Lee & Heilbrun, 2001; Genreau, Little & Goggin, 1996; Loeber & Dishion, 1983), record of referral score and the items included in the criminal history domain were not significantly related to reoffending. In addition, none of the individual-level social history items were significant for the entire sample, male-only sample, or female-only sample. Since overall risk to reoffend is a function of social history score and record of referral score, and record of referral score was not significant for any of the samples, TCJS should consider solely utilizing social history score when determining a youth's overall risk to reoffend.

The inability to detect a significant relationship between record of referral score and recidivism deserves further attention. As previously mentioned, the pre-validation of the PACT and validation on Florida youth found a significant relationship between criminal history and recidivism. A key difference between those studies and the current research was the use of Cox regression rather than logistic regression. The ability of Cox regression to handle censored data, such as the recidivism data included in this and other risk assessment research, increases the accuracy of the results. In addition, due to the infrequent nature of certain items included in the criminal history domain of the PACT, it is possible that the PACT is overlooking or not appropriately weighing indicators of criminal history. For example, commitments and placements are used as a last resort, so although this item impacts a youth's overall risk to reoffend the limited use of these sanctions greatly reduces the chance that a youth's risk to

reoffend will be impacted by this item. For example, a youth who is committed to the TYC is unlikely to be reassessed by TCJS. Committed youth spend between 9 months and 2 years incarcerated at state school. Once released the youth remains on parole with the TYC until he/she turns 19 years old. While on parole, the jurisdiction for further infractions and criminal offenses remains with TYC, making it unlikely that the youth will return to TCJS for a reassessment.

Similar to the addition of community-level indicators, the addition of the attitudes and behaviors score did not increase the overall model fit, nor was the score significantly related to recidivism for males ($p=.701$) or females ($p=.460$). This finding provides evidence for the exclusion of this domain in determining the PACT's overall risk to reoffend, however, this finding is inconsistent with literature suggesting a significant relationship between antisocial attitudes and behaviors and delinquency. After all, three of the “Big 8”, those major criminogenic needs most strongly associated with delinquency, are represented on the PACT's Attitude and Behaviors Domain (Andrews & Dowden, 2007b).

H₃: Gender differences do not exist in the predictive validity of the PACT.

Comparable to other studies concerning the predictive validity of juvenile risk assessments, the PACT was better at predicting risk to reoffend for males than females. Although the difference was slight, the area under the curve for the PACT risk assessment revealed the instrument to be a moderate predictor of male recidivism and a poor predictor of female recidivism. These results were marginally improved over those reported by Baglivio (2009) for the Florida juvenile population, where the area under the curve for males was .590 compared to females at .589. Cox regression analysis further confirmed this finding. The regression model containing overall risk to reoffend as the only predictor of time to recidivism was significant for males but not females. Females recidivated at similar rates and times despite risk to reoffend.

Risk to reoffend for the female population is more homogeneous than that of the male population. More than 80% of females were classified as low risk on their initial PACT assessment. The inability to differentiate recidivism based on overall risk to reoffend is more than likely attributed to this homogeneity.

While the model containing only overall risk to reoffend was not significant for the female-only sample, a model containing record of referral score and social history score was significant at the .1 level. Similar to males, the only significant predictor in this model was social history score. Social-level indicators were most predictive of reoffending for both males and females, however, different predictors were significant for each gender. Female recidivism was significantly impacted by parental control and a history of neglect, whereas male recidivism was significantly predicted by a history of running away or being kicked out and to a lesser extent the incarceration of a household member.

The finding that parental control and neglect were the strongest predictors of female recidivism, corresponded to prior research suggesting a correlation between social relationships and female delinquency (Heimer & DeCoster, 1999; Huebner & Betts, 2002; Laundra, Kiger, & Bahr, 2002). In line with social control theory, the dynamic of the parent/child relationship impacted female recidivism. Girls who consistently disobeyed or were hostile to parental authority were significantly more likely to recidivate than girls who obeyed their parents. Similarly, parental neglect is an indicator of weak bonds between a parent and child and was found to significantly predict female recidivism. These findings provide further evidence to how attachment between a parent and his/her daughter can either lead to the promotion of or desistance from delinquent behaviors.

In sum, the predictive validity of the PACT for females was poor, overall risk to reoffend was not a significant predictor of female recidivism, and social-level indicators predictive of female recidivism differed from male recidivism. Hypothesis 3 is rejected, as evidence indicated the PACTs inability to accurately classify females into risk levels. Gender differences in the predictive validity of the PACT were observed. While Schwalbe (2008) did not find significant gender differences in his meta-analysis of juvenile risk assessments, there appears to be gender differences in the predictive validity of the PACT that deserve attention from TCJS decision makers.

Implications

Limitations

As with all research employing recidivism data based on official statistics, recidivism is underestimated to an unknown degree. Only offenses that come to the attention of law enforcement and are pursued are captured in official data. Furthermore, the recidivism data used to determine the predictive validity of the PACT is county-specific. Tarrant County borders five counties and the juvenile population is mobile, resulting in an unknown amount of recidivism in jurisdictions outside of the scope of this analysis. In order to limit the impact that county-specific recidivism data has on this analysis, all juveniles who resided outside of Tarrant County at the time of assessment were removed from the sample.

The use a twelve month follow-up period fails to account for youth who recidivate after this timeframe has elapsed. Research has demonstrated that recidivism rates are higher in the first twelve months, and after that gradually taper off (Langan & Levin, 2002), and a twelve month follow up period is most often employed in research establishing the predictive validity of juvenile risk assessments (Schwalbe, 2007). Cox regression analysis was employed in this

research due to its ability to increase the accuracy of results when using censored data. To further validate the findings in this research, future research should incorporate a panel analysis to examine the predictive validity of the PACT over additional follow-up timeframes, e.g. 18 months, 24 months, etc. A longitudinal design will serve to determine the stability of the predictive validity of the PACT two and three years after the youth has been assessed.

The inter-rater reliability of the assessment was not determined. Although all probation officers receive and training and a structured interview guide to assist them in completing the assessment, the subjective nature of certain items on the social history create the potential to introduce an unknown amount of bias into the results. The degree to which reliability issues are impacting PACT results is not thought to be significant, however, it is unknown.

Although the results of this research add to the growing body of literature concerning the predictive validity of juvenile risk assessments and more specifically, the validity of the PACT, the generalizability of the results of this analysis is limited. Community-level indicators did not contribute significantly in the prediction of recidivism, suggesting broad application of the PACT in various jurisdictions, however, a number of county-specific results emerged from this analysis when compared to the research conducted on the Florida population. Most notably, record of referral score, was not found to be a significant predictor in Tarrant County but was in the Florida. This result and other key differences, indicate a need for jurisdiction-specific validation and responses to the findings. While other counties interested in adopting the PACT could use the results of this analysis to inform the decision to implement, it would be necessary to validate the instrument on their population.

In generating risk to reoffend, the PACT frequently combines items to create composite scores. In these instances, the score rather than the individual items were employed in this

research. For example, the PACT combines four school-related items to produce a single score for educational issues. Due to the manner in which the PACT collects school-related information, youth who are not currently enrolled are missing data regarding their grades, attendance and conduct. In order to not lose data for youth who were not enrolled, the decision was made to use the school summary measure score computed by the PACT. While it is possible that one or more of the indicators of school-related issues could have been individually significantly related to recidivism, the composite score was not. Future research should look at how these school-related issues individually interact with recidivism. Similarly, the PACT's attitudes and behaviors score was not a significant predictor of recidivism, in contrast to literature suggesting a significant association between antisocial attitudes and behaviors and recidivism. Perhaps one or more of the six items used to create that score are significant. Future research should consider how these items individually predict recidivism.

Future Research

Record of referral score and the items included in this domain were not significantly related to recidivism. This section of the PACT is auto-populated based on operational definition used in the creating the instrument on the original population, juveniles in the state of Washington and Florida. Since definitions were adopted, rather than adapted to local circumstances, legislative and jurisdictional differences could create issues. In other words, while ascribing to the original definitions used to create the instrument enhances the validity of implementation, it could result in Tarrant County attempting to fit a square peg into a round hole. Historically, TCJS has taken the least invasive measures to deal with a youth. The detention population is considered low for a county of its size, and first-time offenders are frequently counseled and released. Referrals are included in the PACT if they are either pending or disposed

of with a qualifying disposition. Furthermore, the PACT counts the most serious referral when multiple referrals are disposed of on the same date, despite when the referral actually occurred. For example, a youth who is referred to the department for burglary of a vehicle and three weeks later, while awaiting disposition for the first case, is referred for assault with bodily injury will only generate points on the record of referral for the assault if the two referrals are consolidated at disposition. This method appears to discount the frequency at which a youth is referred to the department. In 2010, approximately 5% of referrals received a consolidated disposition. In a county where the consolidation of multiple referrals is not an uncommon event, perhaps a more inclusive definition of referral, rather than one constrained by dates, would help to improve the contribution of record of referral in the prediction of risk. Future research should consider how to enhance the predictive power of record of referral on recidivism. After all, empirical research suggests the strongest relationship should have been found between these variables.

In addition, future research should address differences in the predictive validity of the PACT based upon type of reoffense. As this study demonstrated the PACT predicts general offending behaviors moderately well. Prior research on other juvenile assessments has revealed differences in predictive validity based on recidivism type (Catchpole & Gretton, 2003; Meyers & Schmidt, 2008; Schmidt, Hoge & Gomes, 2005). For example, the SAVRY has been found to be an excellent predictor of general recidivism (AUC=.75) and a moderate predictor of violent recidivism (AUC= .66) (Meyers & Schmidt, 2008). Could there be a difference in the predictive validity of the PACT for violent recidivism when compared to general offending? Is the PACT more sensitive to predicting felony-level recidivism when compared to misdemeanor-level? The answers to the questions will provide additional evidence regarding the predictive validity of the PACT assessment.

As previously mentioned, the TJPC has created a risk assessment for the Texas juvenile delinquent population. While the PACT was developed on the Washington and Florida juvenile populations, the RANA was developed using data collected from juvenile probation departments across the state of Texas. Could the predictive validity of a risk assessment created on the population for which it is intended to be used exceed that of an assessment created on a different population? As previously discussed, jurisdictional differences in definitions and decisions could impact the validity of an assessment. Since jurisdictions across Texas are more similar than those outside of the state, it is possible that the predictive validity of the RANA is superior to that of the PACT, especially in regard to items concerning criminal history. A comparative analysis of the predictive validity of the RANA and PACT would serve further inform decision makers in the selection and use of risk assessment on the Tarrant County youth.

CHAPTER 6 CONCLUSION

The first principle of effective intervention is the risk principle. This principle suggests that supervision and related services should relate to the offender's risk to recidivate. In order to make these decisions, it is necessary to accurately categorize offenders into risk levels. This research demonstrated the predictive validity of the PACT for juveniles in Tarrant County, Texas. In the Tarrant County juvenile population, higher risk youth appear to be those who receive an overall risk to reoffend of moderate, moderate-high, and high. In line with the risk principle, decision makers should consider reserving supervision and services for these higher risk youth.

A major determinant of being at increased risk to reoffend was an elevated social history score. Criminogenic needs, as measured by social history score, were a significant, and perhaps the most influential predictor of recidivism. This finding leads to a hypothesis based on the needs principle, that specifically targeting these criminogenic needs should lead to a decrease in recidivism. More specifically, social-level indicators of family dysfunction were significant predictors for males and females, suggesting a need for programming aimed at improving the relationships between the youth and his/her family members.

Now that the predictive validity of the PACT has been established an criminogenic needs identified, it is necessary to ensure that youth are provided with interventions tailored to the individual characteristics of the youth (responsivity principle), and treatment should be offered in conjunction with supervision and sanctions (treatment principle). Finally, interventions should be continually monitored to ensure program integrity (fidelity principle). As evidenced in the literature, the successful implementation of and adherence to the principles of effective

intervention should result in a significant decrease in juvenile recidivism and enhanced public safety.

APPENDIX A: POSITIVE ACHIEVEMENT CHANGE TOOL

Domain 1: Record of Referrals

Item	Responses	Risk Score
1. Age at first offense: The age at the time of the offense for which the minor was referred to juvenile court for the first time on a non-traffic misdemeanor or felony that resulted in diversion, adjudication withheld, adjudication, deferred prosecution or referral to adult court.	None or 17+ 16 15 13 to 14 Under 13	0 1 2 3 4
Felony and misdemeanor referrals: Items 2 and 3 are mutually exclusive.		
2. Misdemeanor referrals: Total number of referrals, as defined in “Domain 1 Definitions” (see above), for which the most serious offense was a non-traffic misdemeanor that resulted in diversion, adjudication withheld, adjudication, deferred prosecution or referral to adult court (regardless of whether successfully completed).	None or one Two Three or four Five or more	0 1 2 3
3. Felony referrals: Total number of referrals, as defined in “Domain 1 Definitions” (see above), for which the most serious offense was for a felony offense that resulted in diversion, adjudication withheld, adjudication, deferred prosecution or referral to adult court (regardless of whether successfully completed).	None One Two Three or more	0 2 4 6
Against-person or weapon referrals: : Items 4, 5, and 6 are mutually exclusive.		
4. Weapon referrals: Total referrals for which the most serious offense was a firearm/weapon charge or a weapon enhancement finding.	None One or more	0 1
5. Against-person misdemeanor referrals: Total number of referrals for which the most serious offense was an against-person misdemeanor – a misdemeanor involving threats, force, or physical harm to another person or sexual misconduct (assault, coercion, harassment, intimidation, etc).	None One Two or more	0 1 2
6. Against-person felony referrals: Number of referrals for which the most serious offense was an against-person felony involving force or physical harm to another person including sexual misconduct defined as a violent felony.	None One or two Three or more	0 2 4
Sex offense referrals: Items 7 and 8 are mutually exclusive..		
7. Sexual misconduct misdemeanor referrals: Number of referrals for which the most serious offense was a sexual misconduct misdemeanor including obscene phone calls, indecent exposure, obscenity, pornography, or public indecency, or misdemeanors with sexual motivation.	None One Two or more	0 0 0
8. Felony sex offense referrals: Referrals for a felony sex offense or involving sexual motivation including carnal knowledge, child molestation, communication with minor for immoral purpose, incest, indecent exposure, indecent liberties, promoting pornography, rape, sexual misconduct, or voyeurism.	None One Two or more	0 0 0
9. Confinements in secure detention where minor was held for at least 48 hours: Number of times the minor was held for at least 48 hours physically confined in a detention facility.	None One Two Three or more	0 1 2 3
10. Commitment orders where minor served at least one day confined under residential commitment: Total number of commitment orders and modification orders for which the minor served at least one day confined under residential commitment. A day served includes credit for time served.	None One Two or more	0 2 4
11. Escapes: Total number of attempted or actual escapes that resulted in adjudication.	None One Two or more	0 1 2
12. Warrants for failure-to-appear in court or absconding from supervision: Total number of failures- to-appear in court or absconding from supervision that resulted in a warrant being issued. Exclude failure-to-appear warrants for non-criminal matters, e.g., traffic citations or infractions.	None One Two or more	0 1 2
Record of Referrals Score:		Max. of 31 points

Domain 2: Social History

Shading indicates items used to compute the Overall Risk to Reoffend.	Responses		Risk Score	
			Static	Dyn
1. Minor's Gender:	<input type="radio"/> Male		1	
	<input type="radio"/> Female		0	
School				
2a. Minor's current school enrollment status, regardless of attendance: If the minor is in continuation school, home school or independent study program as a result of being expelled or dropping out, check expelled or dropped out, otherwise check enrolled, if in continuation school/home school or independent study program.	<input type="radio"/> Graduated, GED <input type="radio"/> Enrolled full-time <input type="radio"/> Enrolled part-time	<input type="radio"/> Suspended <input type="radio"/> Dropped out <input type="radio"/> Expelled		
2b. Minor's conduct in the most recent term: Fighting or threatening students; threatening teachers/staff; overly disruptive behavior; drug/alcohol use; crimes, e.g., theft, vandalism; lying, cheating, dishonesty.	<input type="radio"/> Recognition for good behavior <input type="radio"/> No problems with school conduct <input type="radio"/> Problems reported by teachers <input type="radio"/> Problem calls to parents <input type="radio"/> Calls to police			
2c. Minor's attendance in the most recent term: Full-day absence means missing majority of classes. Partial-day absence means attending the majority of classes and missing the minority.	<input type="radio"/> Good attendance with few absences <input type="radio"/> No unexcused absences <input type="radio"/> Some partial-day unexcused absences <input type="radio"/> Some full-day unexcused absences <input type="radio"/> Habitual truant			
2d. Minor's academic performance in the most recent school term:	<input type="radio"/> Honor student (mostly As) <input type="radio"/> Above 3.0 (mostly As and Bs) <input type="radio"/> 2.0 to 3.0 (mostly Bs and Cs, no Fs) <input type="radio"/> 1.0 to 2.0 (mostly Cs and Ds, some Fs) <input type="radio"/> Below 1.0 (some Ds and mostly Fs)			
Scoring of School is based on items 2a through 2d.	None of the following			0
	Enrolled and: Problems reported by teachers or calls to parents, or some full-day unexcused absences, or mostly Cs and Ds, some Fs			1
	Enrolled and: calls to police, or habitual truant, or some Ds and mostly Fs			2
	Dropped out, expelled or suspended			2
Current Friends/Companions.				
3a. History of anti-social friends/ companions: Anti-social peers are minors hostile to or disruptive of the legal social order; minors who violate the law and the rights of others and other delinquent minors. <i>(Check all that apply).</i>	<input type="checkbox"/> Never had consistent friends or companions <input type="checkbox"/> Had pro-social friends <input type="checkbox"/> Had anti-social friends <input type="checkbox"/> Been a gang member/associate		0 0 0 0	
3b. Current friends/companions minor actually spends time with: <i>(Check all that apply).</i>	<input type="checkbox"/> No consistent friends or companions <input type="checkbox"/> Pro-social friends <input type="checkbox"/> Anti-social friends <input type="checkbox"/> Gang member/associate			See below
Scoring of Current Friends/Companions is based on item 3b.	Has pro-social friends and no anti-social friends			0
	Has no friends, or pro-social and anti-social friends			
	Has all anti-social friends			1
	Is gang member/associate			2
				3

Domain 2: Social History, continued

Shading indicates items used to compute the Overall Risk to Reoffend.	Responses	Risk Score	
		Static	Dyn
4. History of court-ordered or child welfare/child protective/social services voluntary out-of-home and emergency foster shelter care placements exceeding 30 days: Exclude delinquency-related referrals or placements.	<input type="radio"/> No out-of-home placements exceeding 30 days <input type="radio"/> 1 out-of-home placement <input type="radio"/> 2 out-of-home placements <input type="radio"/> 3 or more out-of-home placements	0 1 1 1	
5. History of running away or times kicked out of home: Include times the minor did not voluntarily return within 24 hours, and include incidents not reported by or to law enforcement.	<input type="radio"/> No history of running away/being kicked out <input type="radio"/> 1 instance of running away/kicked out <input type="radio"/> 2 to 3 instances of running away/kicked out <input type="radio"/> 4 to 5 instances of running away/kicked out <input type="radio"/> Over 5 instances of running away/kicked out	0 1 2 2 2	
Jail/Imprisonment History of Persons Involved in the Household.			
6a. History of jail/imprisonment of persons who were ever involved in the household for at least 3 months: (Check all that apply).	<input type="checkbox"/> No jail/imprisonment history in family <input type="checkbox"/> Mother/female caretaker <input type="checkbox"/> Father/male caretaker <input type="checkbox"/> Older sibling <input type="checkbox"/> Younger sibling <input type="checkbox"/> Other member		0 0 0 0 0 0
6b. Jail/imprisonment history of persons who are currently involved with the household: (Check all that apply).	<input type="checkbox"/> No jail/imprisonment history of persons currently in household <input type="checkbox"/> Mother/female caretaker <input type="checkbox"/> Father/male caretaker <input type="checkbox"/> Older sibling <input type="checkbox"/> Younger sibling <input type="checkbox"/> Other member		See below
Scoring of Jail/Imprisonment history of persons currently involved in the household is based on 6b.	<input type="checkbox"/> No sibling(s),mother, father jail/imprisonment <input type="checkbox"/> Sibling(s),mother or father jail/imprisonment		0 1
6c. Problem history of parents who are currently involved with the household: (Check all that apply).	<input type="checkbox"/> No problem history of parents in household <input type="checkbox"/> Parental alcohol problem history <input type="checkbox"/> Parental drug problem history <input type="checkbox"/> Parental physical health problem history <input type="checkbox"/> Parental mental health problem history <input type="checkbox"/> Parental employment problem history		0 0 0 0 0 0
7. Current parental authority and control:	<input type="radio"/> Minor usually obeys and follows rules <input type="radio"/> Sometimes obeys or obeys some rules <input type="radio"/> Consistently disobeys, and/or is hostile		0 1 2

Domain 2: Social History, continued

Shading indicates items used to compute the Overall <i>Risk to Reoffend.</i>	Responses	Risk Score	
		Static	Dyn
Alcohol/drug use.			
8a. Minor's history of alcohol use: <i>(Check all that apply).</i>	<input type="checkbox"/> No past alcohol use <input type="checkbox"/> Past alcohol use <input type="checkbox"/> Alcohol caused family conflict <input type="checkbox"/> Alcohol disrupted education <input type="checkbox"/> Alcohol caused health problems <input type="checkbox"/> Alcohol interfered with keeping pro-social friends <input type="checkbox"/> Alcohol contributed to criminal behavior <input type="checkbox"/> Minor needed increasing amounts of alcohol to achieve same level of intoxication or high <input type="checkbox"/> Minor experienced withdrawal problems	0 0 0 0 0 0 0 0 0	
8b. Minor's history of drug use: <i>(Check all that apply).</i>	<input type="checkbox"/> No past drug use <input type="checkbox"/> Past drug use <input type="checkbox"/> Drugs caused family conflict <input type="checkbox"/> Drugs disrupted education <input type="checkbox"/> Drugs caused health problems <input type="checkbox"/> Drugs interfered with keeping pro-social friends <input type="checkbox"/> Drugs contributed to criminal behavior <input type="checkbox"/> Minor needed increasing amounts of drugs to achieve same level of intoxication or high <input type="checkbox"/> Minor experienced withdrawal problems	0 0 0 0 0 0 0 0 0	
8c. Minor's current alcohol use: <i>(Check all that apply).</i>	<input type="checkbox"/> No current alcohol use <input type="checkbox"/> Current alcohol use <input type="checkbox"/> Alcohol causing family conflict <input type="checkbox"/> Alcohol disrupting education <input type="checkbox"/> Alcohol causing health problems <input type="checkbox"/> Alcohol interfering with keeping pro-social friends <input type="checkbox"/> Alcohol contributing to criminal behavior <input type="checkbox"/> Minor needs increasing amounts of alcohol to achieve same level of intoxication or high <input type="checkbox"/> Minor experiences withdrawal problems		See below
8d. Minor's current drug use: <i>(Check all that apply).</i>	<input type="checkbox"/> No current drug use <input type="checkbox"/> Current drug use <input type="checkbox"/> Drugs causing family conflict <input type="checkbox"/> Drugs disrupting education <input type="checkbox"/> Drugs causing health problems <input type="checkbox"/> Drugs interfering with keeping pro-social friends <input type="checkbox"/> Drugs contributing to criminal behavior <input type="checkbox"/> Minor needs increasing amounts of drugs to achieve same level of intoxication or high <input type="checkbox"/> Minor experiences withdrawal problems		See below
Scoring of Current Alcohol/Drug Use is based on items 8c and 8d.	Current alcohol/drugs not causing family conflict, disrupting education, causing health problems, interfering with keeping pro-social friends or contributing to criminal behavior.		2

Domain 2: Social History, continued

Shading indicates items used to compute the Overall Risk to Reoffend.	Responses	Risk Score	
		Static	Dyn
History of Abuse/Neglect. Include any history that is suspected, whether or not reported or substantiated. Exclude reports of abuse or neglect proven to be false.			
9a. History of violence/physical abuse: Include suspected incidents of abuse if disclosed by minor, whether or not reported or substantiated, but exclude reports investigated but proven to be false. (Check all that apply).	<input type="checkbox"/> Not a victim of violence/physical abuse <input type="checkbox"/> Victim of violence/physical abuse at home <input type="checkbox"/> Victim of violence/physical abuse in a foster/group home <input type="checkbox"/> Victimized by family member <input type="checkbox"/> Victimized by someone outside the family <input type="checkbox"/> Attacked with a weapon		
9b. History of witnessing violence: Include perpetrators and victims of violence as having witnessed violence (Check all that apply).	<input type="checkbox"/> Has not witnessed violence <input type="checkbox"/> Has witnessed violence at home <input type="checkbox"/> Has witnessed violence in a foster/group home <input type="checkbox"/> Has witnessed violence in the community <input type="checkbox"/> Family member killed as result of violence		
9c. History of sexual abuse/rape: Include suspected incidents of abuse if disclosed by minor, whether or not reported or substantiated, but exclude reports investigated but proven to be false. (Check all that apply).	<input type="checkbox"/> Not a victim of sexual abuse/rape <input type="checkbox"/> Sexually abused/raped by family member <input type="checkbox"/> Sexually abused/raped by someone outside the family		
Scoring for History of Abuse/Neglect is based on items 9a and 9c.	No physical or sexual abuse	0	
	physical or sexual abuse	1	
10. History of being a victim of neglect: Include suspected incidents of neglect, whether or not reported or substantiated, but exclude reports investigated but proven to be false.	<input type="radio"/> Not victim of neglect <input type="radio"/> Victim of neglect	0 2	
11. History of mental health problems: Such as schizophrenia, bi-polar, mood, thought, personality, and adjustment disorders. Exclude conduct disorder, oppositional defiant disorder, substance abuse and ADD/ADHD. Confirm by a professional in the social service/healthcare field.	<input type="radio"/> No history of mental health problem(s) <input type="radio"/> Diagnosed with mental health problem(s) <input type="radio"/> Only mental health medication(s) prescribed. If yes, list _____ <input type="radio"/> Only mental health treatment prescribed <input type="radio"/> Mental health treatment and medication(s) prescribed	0 1 1 1 1	
Social History Score:		Maximum of 18 points	

Domain 4: Attitude/Behavior Indicators

<i>This domain does not count toward the calculation of the overall level of risk to re-offend.</i>	Responses	Dynamic Risk Score	Item on Full
1. Attitude toward responsible law abiding behavior:	<input type="radio"/> Abides by conventions/values <input type="radio"/> Believes conventions/values sometime apply to him or her <input type="radio"/> Does not believe conventions/values apply to him or her <input type="radio"/> Resents or is hostile toward responsible behavior	0 1 2 3	10.9
2. Accepts responsibility for anti-social behavior:	<input type="radio"/> Accepts responsibility for anti-social behavior <input type="radio"/> Minimizes, denies, justifies, excuses, or blames others <input type="radio"/> Accepts anti-social behavior as okay <input type="radio"/> Proud of anti-social behavior	0 1 2 3	10.10
3. Belief in yelling and verbal aggression to resolve a disagreement or conflict:	<input type="radio"/> Believes verbal aggression is rarely appropriate <input type="radio"/> Believes verbal aggression is sometimes appropriate <input type="radio"/> Believes verbal aggression is often appropriate	0 1 2	11.3
4. Belief in fighting and physical aggression to resolve a disagreement or conflict:	<input type="radio"/> Believes physical aggression is never appropriate <input type="radio"/> Believes physical aggression is rarely appropriate <input type="radio"/> Believes physical aggression is sometimes appropriate <input type="radio"/> Believes physical aggression is often appropriate	0 1 2 3	11.4
5. Reports/evidence of violence not included in criminal history: <i>(Check all that apply).</i> <i>Maximum of 2 points</i>	<input type="checkbox"/> No reports/evidence of violence <input type="checkbox"/> Violent outbursts, displays of temper, uncontrolled anger indicating potential for harm <input type="checkbox"/> Deliberately inflicting physical pain <input type="checkbox"/> Using/threatening with a weapon <input type="checkbox"/> Fire starting <input type="checkbox"/> Violent destruction of property <input type="checkbox"/> Animal cruelty	0 1 1 1 1 1 1	11.5
6. Reports of problem with sexual aggression not included in criminal history: <i>(Check all that apply).</i> <i>Maximum of 2 points</i>	<input type="checkbox"/> No reports/evidence of sexual aggression <input type="checkbox"/> Aggressive sex <input type="checkbox"/> Sex for power <input type="checkbox"/> Young sex partners <input type="checkbox"/> Child sex <input type="checkbox"/> Voyeurism <input type="checkbox"/> Exposure	0 1 1 1 1 1 1	11.6
Attitude/Behavior Indicators Score:		Maximum of 15 points	

APPENDIX B: PACT SCORING MATRIX

Record of Referrals Risk Score	Social History Risk Score		
	0 to 5	6 to 9	10 to 18
0 to 5	Low	Low	Moderate
6 to 8	Low	Moderate	Moderate-High
9 to 11	Moderate	Moderate-High	High
12 to 31	Moderate-High	High	High

APPENDIX C: OPERATIONAL DEFINITIONS OF STUDY VARIABLES

Construct	Variable	Type	Attribute of Variable	Role of Variable	Operational Definition	Data Source
Risk to Reoffend	1. Record of Referral	1. Continuous (0-31)	1=low 2=moderate 3=moderate-high 4=high	Independent/ Predictor	PACT overall risk to reoffend as determined by record of referral and social history score.	PACT
	2. Social History Score	2. Continuous (0-18)				
Record of Referral	1. Age at First Offense	1. Categorical	1. 0=None/Over 16 1=16 2=15 3=13 to 14 4=Under 13	Independent/ Predictor	PACT Record of referral indicative of the youth's criminal history.	PACT
	2. Misdemeanor Referrals	2. Categorical	2. 0= None or One 1=Two 2=Three or Four 3=Five or More			
	3. Felony Referrals	3. Categorical	3. 0= None 1=One 2=Two 3=Three or More			
	4. Weapon Referrals	4. Categorical	4. 0=None 1=One or More			
	5. Against-person Misdemeanor Referrals	5. Categorical	5. 0=None 1=One 2=Two or More			
	6. Against-person Felony Referrals	6. Categorical	6. 0=None 1=One or Two 2=Three or More			
	7. Confinements	7. Categorical	7. 0=None 1=One 2=Two 3=Three or More			

	8. Commitment Orders	8. Categorical	8. 0=None 1=One 2=Two or More		
	9. Escapes	9. Categorical	9. 0=None 1=One 2=Two or More		
	10. Warrants	10. Categorical	10.0=None 1=One 2=Two or More		
Social History Score	See below for Individual Risk Factors and Social Risk Factors. See Appendix A for Social History Scoring Guide.	Categorical Indicators		Independent/Predictor	Overall social history score as determined by individual and social risk factor items that comprise Domain 2 of the PACT Pre-Screen..
Individual Risk Factors	1. Gender	1. Categorical	1. 0=female 1=male		See Appendix A for complete operational definitions.
	2. School Issues	2. Categorical	2. 1=None 2= Enrolled with some issues relating to grades, attendance and/or conduct 3= Enrolled with major issues relating to grades, attendance and/or conduct or Dropped out, expelled, or suspended		
	3. Alcohol/ Drug Use	3. Categorical	3. 0=No current drug or alcohol use 1=Current drug or alcohol use		
	4. Mental Health	4. Categorical	4. 0=No history of mental health problems 1=History of mental health problems		
Social Risk Factors	1. Peers	1. Categorical	1. 1= Pro-social friends 2=No Friends 3=Anti-social friends 4=Gang member/associate		See Appendix A for complete operational definitions.

	2. Incarceration of Household Member	2. Categorical	2. 0=No jail imprisonment 1=Jail/imprisonment		
	3. Parental Control	3. Categorical	3. 1=Minor usually obeys and follows rules 2= Sometimes obeys or obeys some rules 3=Consistently disobeys, and/or is hostile		
	4. Runaways	4. Categorical	4. 1=No runaway history 2=1 runaway 3=2 to 3 runaways 4=4 to 5 runaways 5=Over 5 runaways		
	5. Placements	5. Categorical	5. 1=No placements 2=1 placement 3=2 placements 4=3 or more placements		
	6. History of physical/sexual abuse	6. Categorical	6. . 0=No history of physical or sexual abuse 1=Physical or sexual abuse		
	7. Victim of neglect	7. Categorical	7. . 0=Not a victim of neglect 1=Victim of neglect		
Attitude/ Behavior Score	1. Law-abiding behavior	1. Categorical	1. 1=Abides by conventions/values 2=Believes conventions sometimes apply 3=Does not believe conventions apply 4=Resents/hostile toward responsible behavior	Overall Attitude/Behavior Indicators Score (0-15) as determined by the six questions included in Domain 4 of the PACT pre-screen.	PACT
	2. Responsibility for anti-social behavior	2.Categorical	2. 1=Accepts responsibility for anti-social behavior 2=Minimizes, denies, justifies, excuses, blames others 3=Accepts anti-social behavior as okay 4=Proud of anti-social behavior		
	3. Verbal Aggression	3. Categorical	3. 1=Believes verbal aggression is rarely appropriate 2=Believes verbal aggression is sometimes		

			appropriate 3=Believes verbal aggression is often appropriate		
	4. Physical Aggression	4. Categorical	4. 1=Believes physical aggression is never appropriate 2=Believes physical aggression is rarely appropriate 3=Believes physical aggression is sometimes appropriate 4=Believes physical aggression is often appropriate		
	5. Violence	5. Categorical	5. 0=No reports of violence 1=One reported problem 2=Two or more reported problems		
	6. Sexual Aggression	6. Categorical	6. 0=No reports of sexual aggression 1=One reported problem 2=Two or more reported problems		
Neighborhood Disadvantage (Kubrin & Stewart, 2006)	1. Percentage of single-parent households. 2. Percentage of persons below poverty level. 3. Percentage of persons unemployed.	1. Continuous 2. Continuous 3. Continuous		Independent/ Predictor	Socioeconomic status of the neighborhood that the juvenile resides in at the time they are administered the PACT. KIDS/ US Census Bureau
Recidivism		Dichotomous	0=no 1=yes	Dependent/ Predicted	Any referral to Tarrant County Juvenile Services or Tarrant County Adult Criminal Courts, for a Felony or Class A or B Misdemeanor offense within 12 months following the assessment. KIDS

APPENDIX D: FREQUENCY OF PREDICTOR VARIABLES BY GENDER

Table 18. Record of Referral Predictor Variable Frequencies

Predictor Variable	Frequency (%)		
	Total	Females	Males
Age at First Offense			
None/Over 16	114 (3.7%)	66 (2.1%)	48 (1.5%)
16	663 (21.3%)	178 (5.7%)	485 (15.6%)
15	658 (21.1%)	191 (6.1%)	467 (15.0%)
13 to 14	1131 (36.3%)	280 (9.0%)	851 (27.3%)
Under 13	551 (17.7%)	94 (3.0%)	457 (14.7%)
Misdemeanor Referrals			
None or one	2544 (81.6%)	694 (22.3%)	1850 (59.3%)
Two	401 (12.9%)	82 (2.6%)	319 (10.2%)
Three or Four	154 (4.9%)	28 (0.9%)	126 (4.0%)
Five or more	18 (0.6%)	5 (0.2%)	13 (0.4%)
Felony Referrals			
None	1807 (58.0%)	604 (19.4%)	1203 (38.6%)
One	1101 (35.3%)	190 (6.1%)	911 (29.2%)
Two	178 (5.7%)	12 (0.4%)	165 (5.3%)
Three or more	31 (1.0%)	2 (0.1%)	29 (0.9%)
Weapon Referrals			
None	2991 (96.0%)	800 (25.7%)	2191 (70.3%)
One or more	126 (4.0%)	9 (0.3%)	117 (3.7%)
Against-person Misdemeanor Referrals			
None	2357 (75.6%)	571 (18.3%)	1786 (57.3%)
One	678 (21.8%)	209 (6.7%)	469 (15.0%)
Two or more	82 (2.6%)	29 (0.9%)	53 (1.7%)
Against-person Felony Referrals			
None	2592 (83.2%)	712 (22.8%)	1880 (60.3%)
One or two	523 (16.8%)	96 (3.1%)	427 (13.7%)
Three or more	2 (0.1%)	1 (0.05%)	1 (0.05%)
Confinements exceeding 48 hours			
None	2624 (84.2%)	727 (23.3%)	1897 (60.9%)
One	269 (8.6%)	47 (1.5%)	222 (7.1%)
Two	114 (3.7%)	21 (0.7%)	93 (3.0%)
Three or more	110 (3.5%)	14 (0.4%)	96 (3.1%)
Commitment Orders			
None	3098 (99.4%)	806 (25.9%)	2292 (73.5%)
One	17 (0.5%)	2 (0.1%)	15 (0.5%)
Two or more	2 (0.1%)	1 (0.05%)	1 (0.05%)
Escapes			
None	3115 (99.9%)	808 (25.9%)	2307 (74.0%)
One	2 (0.1%)	1 (0.05%)	1 (0.05%)
Two or more	0 (0.0%)	0 (0.0%)	0 (0.0%)
Warrants			
None	2997 (96.2%)	790 (25.3%)	2207 (70.8%)
One	82 (2.6%)	14 (0.4%)	68 (2.2%)
Two or more	38 (1.2%)	5 (0.1%)	33 (1.1%)

Table 19. Social History Predictor Variable Frequencies

Predictor Variable	Frequency (%)		
	Total	Females	Males
Gender			
Male	2308 (74.0%)		
Female	809 (26.0%)		
School Issues			
None	1093 (35.1%)	327 (10.5%)	766 (24.6%)
Enrolled with some issues relating to grades, attendance and/or conduct	1049 (33.7%)	244 (7.8%)	805 (25.8%)
Enrolled with major issues relating to grades, attendance and/or conduct or Dropped out, expelled, or suspended	975 (31.3%)	238 (7.6%)	737 (23.6%)
Drug/Alcohol Use			
No	2079 (66.7%)	584 (18.7%)	1495 (48.0%)
Yes	1038 (33.3%)	225 (7.2%)	813 (26.1%)
Mental Health Issues			
No	2640 (84.7%)	668 (21.4%)	1972 (63.3%)
Yes	477 (15.3%)	141 (4.5%)	336 (10.8%)
Physical/Sexual Abuse			
No	2603 (83.5%)	595 (19.1%)	2008 (64.4%)
Yes	514 (16.5%)	214 (6.9%)	300 (9.6%)
Neglect			
No	2976 (95.5%)	767 (24.6%)	2209 (70.9%)
Yes	141 (4.5%)	42 (1.3%)	99 (3.2%)
Peers			
Pro-social friends ONLY	1064 (34.1%)	304 (9.8%)	760 (24.4%)
Mix or No friends	1350 (43.3%)	359 (11.5%)	991 (31.8%)
Anti-social friends	257 (8.2%)	61 (2.0%)	196 (6.3%)
Gang member/associate	446 (14.3%)	85 (2.7%)	361 (11.6%)
Incarceration of Household Member			
No	2218 (71.2%)	571 (18.3%)	1647 (52.8%)
Yes	899 (28.8%)	238 (7.6%)	661 (21.2%)
Parental Control			
Usually obeys and follows rules	1646 (52.8%)	417 (13.4%)	1229 (39.4%)
Sometimes obeys	1131 (36.3%)	286 (9.8%)	845 (27.1%)
Consistently disobeys	340 (10.9%)	106 (3.4%)	234 (7.5%)
History of Running Away			
No runaway history	2167 (69.5%)	463 (14.9%)	1704 (54.7%)
1 runaway	365 (11.7%)	115 (3.7%)	250 (8.0%)
2 or more runaways	585 (18.8%)	231 (7.4%)	354 (11.4%)
Placements			
No placements	2889 (92.7%)	737 (23.6%)	2152 (69.0%)
1 or more placement	228 (7.3%)	72 (2.3%)	156 (5.0%)

Table 20. Attitude and Behavior Predictor Variable Frequencies

Predictor Variable	Frequency (%)		
	Total	Female	Male
Attitude toward law-abiding behavior			
Abides by conventions	1818 (58.3%)	496 (15.9%)	1322 (42.4%)
Believes conventions sometime apply	1077 (34.6%)	258 (8.3%)	819 (26.3%)
Does not believe conventions apply	122 (3.9%)	27 (0.9%)	95 (3.0%)
Resents responsible behavior	100 (3.2%)	28 (0.9%)	72 (2.3%)
Responsibility for anti-social behavior			
Accepts responsibility	1990 (63.8%)	538 (17.3%)	1452 (46.6%)
Minimizes, denies, or justifies	978 (31.4%)	240 (7.7%)	738 (23.7%)
Accepts anti-social behavior as okay	114 (3.7%)	25 (0.9%)	89 (2.8%)
Proud of anti-social behavior	35 (1.1%)	6 (0.2%)	29 (0.9%)
Verbal Aggression			
Rarely appropriate	1506 (48.3%)	347 (11.1%)	1159 (37.2%)
Sometimes appropriate	1183 (38.0%)	295 (9.5%)	888 (28.5%)
Often appropriate	428 (13.7%)	167 (5.4%)	261 (8.4%)
Physical Aggression			
Never appropriate	1375 (44.1%)	369 (11.8%)	1006 (32.3%)
Rarely appropriate	736 (23.6%)	184 (5.9%)	552 (17.7%)
Sometimes appropriate	795 (25.5%)	200 (6.4%)	595 (19.1%)
Often appropriate	211 (6.8%)	56 (1.8%)	155 (5.0%)
Evidence of violence			
None	2037 (65.4%)	491 (15.8%)	1546 (49.6%)
One	533 (17.1%)	145 (4.7%)	388 (12.4%)
Two or more	547 (17.5%)	173 (5.5%)	374 (12.0%)
Evidence of sexual aggression			
None	3060 (98.2%)	802 (25.7%)	2258 (74.4%)
One	37 (1.2%)	3 (0.1%)	34 (1.1%)
Two or more	20 (0.6%)	4 (0.1%)	16 (0.5%)

APPENDIX E: IRB APPROVAL LETTER



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

From : **UCF Institutional Review Board #1
FWA00000351, IRB00001138**

To : **Julie H. Martin**

Date : **February 03, 2011**

Dear Researcher:

On 02/03/2011 the IRB determined that the following proposed activity is not human research as defined by DHHS regulations at 45 CFR 46 or FDA regulations at 21 CFR 50/56:

Type of Review: Initial Submission Form
Project Title: Predicting Risk to Reoffend in the Juvenile Offender
Population
Investigator: Julie H Martin
IRB ID: SBE-11-07405

University of Central Florida IRB review and approval is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are to be made and there are questions about whether these activities are research involving human subjects, please contact the IRB office to discuss the proposed changes.

On behalf of the IRB Chair, Joseph Bielitzki, DVM, this letter is signed by:

Signature applied by Janice Turchin on 02/03/2011 12:27:37 PM EST

A handwritten signature in cursive script that reads "Janice Turchin".

IRB Coordinator

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