Assessment of Criminal Thinking as a Predictor and Mediator of Behavior Problems in a Community Youth Sample

Lauren Annabel Delk

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University

In partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Psychology

Lee D. Cooper, Chair

Jungmeen Kim-Spoon

Thomas H. Ollendick

Angela Scarpa-Friedman

April 24, 2020

Blacksburg, VA

Key words: Criminal Thinking, Youth, Community, Validation, Mediation

Assessment of Criminal Thinking as a Predictor and Mediator of Behavior Problems in a Community Youth Sample

Lauren Annabel Delk

ABSTRACT

Criminal behavior results in negative, costly consequences for both individuals and society at large. Therefore, researchers have worked to identify variables that predict recidivism, or recurrence of crime. The variables with the strongest predictive power include criminal thinking, personality traits, antisocial peers, and family difficulties, among others. In addition, policy makers and stakeholders are creating interventions which target criminal thinking, to reduce criminal thinking and hopefully reduce future crime.

However, little is known about measuring criminal thinking in community youth for the purposes of early intervention and prevention of future behavior problems. Therefore, this study examined a measure of criminal thinking in community youth to examine item-level and measure validity. It also sought to examine if criminal thinking acts as a mediator between other risk factors and subsequent behavior problems.

Although some items may need to be revised, results suggested generally good validity for the total score. This study also supports the stability of criminal thinking in community youth, and thus could be used as a measure of change. Finally, results suggest that criminal thinking mediates the relationships between antisocial friends and parenting styles in predicting reactive aggression.

The results of the item-level analysis of this study highlight the similarities between psychopathy and criminal thinking. Questions also arise about the relationship between criminal thinking in community youth and more transdiagnostic concepts, such as emotion regulation

problems. Overall, criminal thinking appears to be a viable target for assessment and intervention in community youth.

Assessment of Criminal Thinking as a Predictor and Mediator of Behavior Problems in a Community Youth Sample

Lauren Annabel Delk

GENERAL AUDIENCE ABSTRACT

Researchers seeking to reduce crime, because of its negative effects on society, have identified some features of a person and situations that are closely related to a person committing future crimes. Specifically, criminals tend to think in certain ways that promote crime, called criminal thinking styles. If those thinking styles are changed, then people may be less likely to commit future crimes. However, the field does not know if these criminal thinking styles are the same for youth in the community. Therefore, this study examined a measure of criminal thinking in community youth.

Results show that the measure seems to work appropriately in community youth. Although not all items are the best for these youth, overall, the measure works well in predicting behavior problems, as expected. The measure also shows that criminal thinking in youth generally stays the same over time. Finally, this study shows that some features of youth which predict behavior problems are related to behavior problems because of the presence of criminal thinking.

This study shows that a measure of criminal thinking, originally created for use in a justice-involved adult population, can also be used with community youth. It may then be used to assess youth who are on the verge of getting into trouble for criminal thinking styles. Interventions could use this measure to see if the criminal thinking styles are being reduced. Finally, because criminal thinking explains the relationship between other personal factors and

behavior problems, interventions can focus on just criminal thinking, and not all the other factors, as a way to reduce future behavior problems.

Acknowledgements

There are a number of people in the New River Valley and beyond that helped make this dissertation and the completion of my graduate studies possible. I would first like to thank my academic advisor, Dr. Lee Cooper. His wisdom, patience, and kindness has helped me grow in my research, writing, professional sense of self, and clinical work. His willingness to formally step into the role as academic advisor, support in this dissertation project, and counsel throughout my graduate career will never be forgotten. I must also note the years of guidance in these areas from Dr. Bradley White, both prior to and after his move to the University of Alabama. Completing this degree and becoming the professional I am today would not have been possible without his willingness and attention to detail in both research and clinical work.

My committee, Dr. Angela Scarpa, Dr. Jungmeen Kim-Spoon, and Dr. Thomas Ollendick have been pillars of support and knowledge in this process. Their areas of expertise in youth development and behavior helped bring this study to fruition. The ongoing collaboration, and balance of high standards and flexibility, was much appreciated as we worked through many revisions to the plan for this study. I also appreciate the I-SPI undergraduate research assistants who worked hard to advertise for this project at numerous libraries, community service boards, and recreation centers across the United States. In addition, much gratitude is owed to the Virginia Tech Graduate Research and Development Fund for financially supporting this study.

To my husband, Kaleb Delk, thank you for ***everything***. I am so grateful that you are my partner in life. It would not be complete without you. To my parents, Sue and Jim Miller, my grandparents Annette and Harry Bryan, my brother, Bryan, and my in-laws – I am so grateful for your love, support, reassurance, and sacrifices towards those ends throughout the years of my

graduate training. You all help keep me grounded and put life in focus when it is overwhelming. Thank you, and this achievement is owed partially to you.

To my cohort (the best cohort), Sarah Radtke, Reina Factor, Marlene Strege, Ransom Campbell, and Carlos Salinas. You all have become family and will always be. I'm so thankful we support each other in all areas of life. In addition, Alyssa Gatto has been an exceptional lab-mate throughout this research process, you're a joy to work with. In the grander scheme of graduate school, I want to recognize my older "lab siblings"- Amber Turner, Roberto Guerra, and Haley Murphy (though we were lab-mates from afar). Finally, the River Church has been a foundation stone for me over the past six years. Thank you to Austin and Jeananne Knies, Erin and John Yoder (and the boys), Chris and Claire Andrews, Sarah and Seth McCoy, Chelsea and Kevin Lyles, Jerald and Anita Walz, and Alan and Jaynie Shryer for doing life with me and supporting me always.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Crime is associated with significant harm to the victims and the broader community. The financial consequences of crime extend beyond the offense (e.g., theft, property damage, etc.). The long-term financial commitment necessary to incarcerate and rehabilitate offenders should not be overlooked. A 2010 report estimated an average cost per inmate of over 31 thousand dollars and total costs of approximately 39 billion per year (Henrichson & Delaney, 2012). More recent research cites a cost of 500 billion dollars spent on incarceration each year in the United States (Pettus-Davis, Brown, Veeh, & Renn, 2016). Regarding youth offenders, a recent report from the Council of Economic Advisors (2016) suggests that cost per annum to incarcerate one juvenile could be over 100 thousand dollars, and the most recent census reports over 45 thousand youth incarcerated in the United States as of 2016 (Puzzanchera, Hockenberry, Sladky, & Kang, 2018).

Incarceration of youth can increase the likelihood of future incarceration as an adult by 23% (Aizer & Doyle, 2015; Lambie & Randell, 2013). Therefore, youth incarceration leads to further associated costs to society. Early identification and intervention are crucial to interrupt patterns of behavior that could escalate into more serious offending later in life (Dodge et al., 2015; Sawyer, Borduin, & Dopp, 2015). Therefore, we must examine the knowledge base of risk factors for crime, as well as ways to assess risk with reliable and valid measures to support early intervention programs.

The Risk-Need-Responsivity Model

One of the best supported models for understanding risk factors associated with criminal behavior is the Risk-Need-Responsivity (RNR) model (Figure 1; Andrews, Bonta, & Hoge, 1990; Gendreau, Little & Goggin, 1996). This model helps identify individuals who are considered moderate to high "risk" level and target them for intervention. The greatest possibility

of treatment gains and reduction of future problematic behavior lies with these moderate to high "risk" individuals (Lipsey, 2009; Lovins, Lowenkamp & Latessa, 2009; Lovins, Lowenkamp, Latessa, & Smith, 2007). Risk assessment instruments (e. g., the Youth Assessment Screening Instrument; Jones, Brown, Robinson, & Frey, 2016) may be used to identify this set of individuals prone to criminal behavior (Baglivio, 2009).

Next, the "need" refers to *criminogenic needs*, which are areas of "need" that can be addressed to reduce future criminal behavior (Andrews, Bonta, & Wormith, 2006). These areas of need are commonly referred to as risk factors in the literature. Risk factors that are predictive of criminal behavior were identified through personality and cognitive social learning theories, as well as through research studies (Andrews et al., 2012; Bonta & Andrews, 2016; see McGuire, 2004 for review).

Finally, the model's "responsivity" piece ties it all together by implementing evidence-based practices, such as cognitive social learning interventions to respond to the identified "needs" within moderate to high "risk" individuals (Bonta & Andrews, 2007). Notably, adherence to the RNR model demonstrates strong reductions in youth offender recidivism, especially when focusing on multiple risk factors (r = .26; Bonta & Andrews, 2016; Chadwick, Dewolf, & Serin, 2015; Manchak, & Cullen, 2015; Peterson-Badali, Skilling, & Haqanee, 2015).

The risk factors for future crime have been termed the "central eight" and are highly predictive of future criminal behavior, with mean predictive criterion validity estimates at r = .41 (Andrews et al., 2006). The central eight criminogenic risk factors include the following: procriminal attitudes (criminal thinking), antisocial personality patterns, procriminal associates, history of criminal behavior, family/marital difficulties, limited school or work success, substance abuse, and leisure/recreation that allows for antisocial pursuits (Bonta & Andrews,

2016). The central eight risk factors are distinct from *non-criminogenic needs*, which are areas that could be targeted for improvement, but do not necessarily predict future criminal activity (e.g., self-esteem, physical health, etc.).

Importantly, the central eight are generally conceptualized as *dynamic risk factors*, defined as factors that can be changed. However, the definition of dynamic can range from acute dynamic (indicating relatively fast-changing factors) to more stable factors that change over weeks, months, or years (Andrews et al., 2006). Examining these risk factors for the most dynamic allows stakeholders to prioritize targeting that risk factor, if not all risk factors can be addressed. For example, if the system is limited in time for intervention or resources (e.g., training laypersons in brief interventions) then some risk factors may need to be prioritized over others.

However, in considering each risk factor, history of criminal behavior is typically considered the least dynamic of the risk factors (i.e., past criminal behavior is static, but one may be able to prevent additional arrests; Bonta & Andrews, 2010). Next, antisocial personality patterns are notoriously difficult to treat, with few studies examining change and treatment approaches (Bateman, O'Connell, Lorenzini, Gardner, & Fonagy, 2016; Hecht et al., 2018; Wong, Stockdale, & Olver, 2017). Although procriminal associates may change by altering the youth's context (e.g., change schools, institute a curfew), this can be difficult to manage if youth are not motivated to change (e.g., Giordano, Cernkovich, & Holland, 2003; Serin & Lloyd, 2009). In addition, parents may not be able to monitor youth regarding their leisure time, friendships, or drug use if the parent-child relationship is especially tenuous, parents must work multiple jobs, or are single parents (e.g., Kerns, Aspelmeir, Gentzler & Grabill, 2001; Laird, Criss, Pettit, Dodge & Bates, 2008; Laird, Pettit, Bates & Dodge, 2003). Finally, working on

family relationships and educational success are both important, but can be complex and take time to see change, and thus should not be the only point of intervention for at-risk youth (Stevens, 2018; Swisher & Dennison, 2016). Hence, the remaining risk-factor that may be most amenable to change, and is central to this study, is criminal thinking.

Criminal Thinking

Criminal thinking is defined as a pattern of cognitions associated with and in support of living a criminal lifestyle (Walters, 1995). Criminal thinking influences both a person's internal decision-making process and his or her interactions with situations and other people, thereby it is important as a potential driver of criminal behavior (e.g., Douglas & Skeem, 2005). It also likely heightens the influence of other risk factors (e.g., resulting in more time with procriminal associates, poor school/work performance, substance use, etc.). In adults, an increase in criminal thinking is predictive of less time to next arrest when controlling for age, criminal history, and race (Walters & Cohen, 2016). Unsurprisingly, reduction in criminal thinking therefore predicts reduced likelihood of future criminal behavior (Walters, 2017).

For youth, criminal thinking appears to be a risk factor for a variety of offender types, supporting it as an important risk factor that could generalize to many different juvenile offenders (García-Gomis, Villanueva, & Jara, 2017). Notably, there is evidence that criminal thinking is one of the strongest predictors of criminal offending in youth (Gendreau et al., 1996; Simourd, Hoge, Andrews, & Leschied, 1994). Criminal thinking also seems to serve as a mediator between past and future criminal activity, which means that it potentiates future criminal behavior (Walters & DeLisi, 2013). Taken together, these findings further emphasize the need to target criminal thinking as a dynamic risk factor to accurately assess and potentially change (Bonta & Andrews, 2016).

Development and Evaluation of Assessment Measures

Since criminal thinking is an important mechanism in predicting criminal behavior, a reliable and valid form of measurement is necessary. Best practices from the field of psychometrics suggests that there are three key steps for development of a measure (see Morgado, Meireles, Neves, Amaral, & Ferreira, 2018 for a review): item generation, theoretical analysis, and construct validity and reliability. These steps are detailed below and used as guidelines for the present study.

Item Generation Analysis: Scale Adaptation for Community Youth

Many scales have previously been created for measuring criminal thinking, however, as they were intended for adult criminal populations, they may not be properly fit for use in other groups. Therefore, it is recommended to reassess item fit when a measure is transferred to use in a new population (e.g., Olino et al., 2012). Item response theory may be used to refine a measure and remove items that are not a good fit for measuring the construct at hand (Meijer & Baneke, 2004). This process may then necessitate changing item content or scale construction, perhaps by constructing a revised scale, which should also then undergo psychometric analysis (Boateng, Nielands, Frongillo, Melgar-Quiñonez, & Young, 2018).

Theoretical Analysis: Assessment of Criminal Thinking

Measure development does not stop at the granular level of the items, it must also consider the broader theory of what is being measured. Theoretical analysis of a measure examines if the items reflect the desired construct (Morgado et al., 2018). Researchers have sought to understand and measure criminal thinking styles since the mid-1990's and over time they have come to differentiate criminal thought content from process (see Figure 2). Criminal thought processes are defined as the steps or means that allow for criminal behavior such as the

method of planning (or not), enactment, and justification (Walters, 2009). One of the original inventories of criminal thinking is the Psychological Inventory of Criminal Thinking Styles (PICTS; Walters, 1995). The PICTS has undergone several exploratory factor analyses with the most recent work concluding that the PICTS distinguishes two main criminal thinking styles: reactive criminal thinking (RCT; e.g., problem avoidance, rashness) and proactive criminal thinking (PCT; e.g., externalizing blame, entitlement; Egan, McMurran, Richardson, & Blair, 2000; Walters & Yurvati, 2017).

Criminal thought content refers to aspects of the criminal act (e.g., the goal driving the criminal behavior, specific deterrents of the behavior; Walters, 2009). The intersecting fields of psychology and criminology identify via factor analysis three overarching themes of criminal thought content: *control* (need for power and control over others and the environment), *cognitive immaturity* (impulsivity, rashness, difficulty judging their own thoughts), and *egocentrism* (pervasive focus on the self; Mandracchia, Morgan, Garos, & Garland 2007). Although the Measure of Offender Thinking Styles-Revised (MOTS-R; Mandracchia & Morgan, 2011) was created to specifically tap these three themes, other measures of criminal thinking may also assess all three content themes (see Kroner & Morgan, 2014 for a summary).

Of the measures reviewed by Kroner and Morgan (2014), they suggest that the PICTS, the Criminogenic Thinking Profile (CTP; Mitchell & Tafrate, 2012), and the Texas Christian University Criminal Thinking Scales (CTS; Knight, Garner, Simpson, Morey, & Flynn, 2006) cover all three criminal thought content areas (control, cognitive immaturity, and egocentrism). Nonetheless, other scholars argue that the PICTS focuses on criminal thought process and that the CTP does not appear to assess criminal thought processes (Vaske, Gehring, & Lovins, 2017; Walters & Lowenkamp, 2016). Thus, based on review of the present literature, the CTS is the

appropriate measure to assess both content and process of criminal thinking. Notably, there are several peer-reviewed studies in which the CTS is used with juveniles, suggesting that the CTS is an acceptable measure of criminal thinking in youth (Becan, Knight, Crawley, Joe, & Flynn, 2015; Crawley, Becan, Knight, Joe, & Flynn, 2015; Dembo, Turner, & Jainchill, 2007). However, it is worth noting that no measure of criminal thinking has been specifically developed for use in a community youth population. Thus, the selection of the CTS as the "best fit" measure is based on its ability to assess both content and process of criminal thinking and preliminary evidence of utility with juveniles. As such, a more formal evaluation of validity and reliability in community youth is warranted before widely using the CTS with that population.

Psychometric Analysis: Community Youth and Non-adjudicated Populations

The final stage of measure development and examination for use in new populations consists of examining the psychometrics of the measure, including convergent, divergent, and incremental validity, as well as reliability (Morgado et al., 2018). Convergent validity is identified by examining if the measure is closely related to other variables that are conceptually similar in nature. Divergent validity, on the other hand, is the expectation that conceptually unrelated variables will not be significantly related (Krabbe, 2016). Finally, incremental validity is supported if a measure provides additional predictive power for a dependent variable beyond other related assessment measures (Hunsley & Meyer 2003). Reliability is also necessary for assessment validation, which means that a measure will provide consistent, reproducible estimates of the underlying construct (Krabbe, 2016). Although there is empirical evidence that criminal thinking is related to criminal behaviors (i.e., convergent validity), criminal thinking has rarely been investigated as a predictor of behavior among non-adjudicated youth (i.e., youth not

convicted of a crime). Therefore, we do not know that measures of criminal thinking are reliable and valid in non-adjudicated youth.

A brief review of associated studies may provide some insight to the reliability and validity of measuring criminal thinking in community samples. For example, criminal thinking was examined in civil psychiatric patients (Carr, Rosenfeld, Magyar, & Rotter, 2009). Researchers found that criminal thinking is related to substance use and arrest history, suggesting that criminal thinking can be a useful measurement in a non-incarcerated population. Moreover, measures of criminal thinking are used to identify treatment needs for individuals in drug treatment and could be similarly used to identify treatment needs for at-risk youth (Simpson, Joe, Knight, Rowan-Szal, & Gray, 2012). In college students without a criminal history, criminal thinking is correlated with impulsivity and Antisocial Personality Disorder traits (Mitchell, Bartholomew, Morgan, & Cukrowicz, 2017). Finally, college students retroactively identified as bullies in late adolescence reported high levels of criminal thinking compared to controls, and across the sample there were strong correlations (i.e., $r > .48$) between criminal thinking and aggression, psychopathy, and number of criminal offenses (Ragatz, Anderson, Fremouw, & Schwartz, 2011).

Of the few studies that measured criminal thinking in non-adjudicated youth there was one cross-national survey of seventh through ninth grade youth which demonstrated that proactive (i.e., planned and calculated) and reactive (i.e., impulsive) criminal thinking are positively correlated (as in criminal populations), and both are predictive of offending (Walters, 2018). However, this study did not examine other measures of convergent validity (e.g., aggression) or the stability of criminal thinking. From a prevention perspective, if such thinking styles are present in non-adjudicated youth and related to behavior problems, they may then be

treated as high-priority dynamic needs in the RNR model and targeted for change prior to the youth engaging in crime.

In addition to understanding criminal thinking in community youth, it may also be helpful to learn more about the stability of criminal thinking in order to use it as a measure of change in treatment. Calls for repeated measure designs have been in the field for several years, and most studies only measure pre and post treatment, which precludes analysis of fluctuations in criminal thinking (Walters & Lowenkamp, 2016). Although the PICTS has shown good stability in young adult males, similar stability has never been assessed in community youth (Palmer & Hollin, 2004). Similarly, test-retest reliability was assessed in the initial validation of the CTS (Knight et al., 2006), however, this was only completed in adults and has not been examined for youth. Identifying if criminal thinking is stable or fluctuates over the timespan of months has never been examined previously and is necessary to aid interpretation of the influence of intervention programs which report decreases in criminal thinking.

Criminal Thinking in Relationship to Other Variables

Once criminal thinking can be reliably measured in non-adjudicated youth, the next step to targeting criminal thinking for intervention is to better understand how criminal thinking relates to behavior problems and other influential variables. As discussed above, criminal thinking is likely to predict behavior problems (e.g., Dembo et al., 2007; Douglas & Skeem, 2005; Walters & Cohen, 2016), so attempting to change criminal thinking could be beneficial. If criminal thinking also explains the relationship between other risk factors and behavior problems, then targeting criminal thinking could reduce or eliminate those relationships as well, thereby impacting multiple risk factors by only targeting criminal thinking.

Mediational Analysis: Criminal Thinking and Behavior Problems

Mediation, as depicted in Figure 3, is a process in which the relationship between an independent variable (X) predicts the dependent variable (Y, the relationship is path c) because of the mediator (M; MacKinnon, 2008). A mediational model identifies and analyzes support for temporal associations and makes theoretical claims about causality but does not prove the proposed casual pathway. Prior studies have shown that criminal thinking connects, or mediates, the relationship between pro-criminal associates and delinquency, as well as between substance abuse and recidivism (Walters, 2012; Walters, 2016a). That is, in those studies pro-criminal associates predict higher levels of criminal thinking (path a; Figure 3), which in turn predicts higher levels of delinquency (path b). Similarly, substance abuse predicts higher levels of criminal thinking and subsequently higher levels of recidivism. If there is mediation between variables, then the combination of path a and path b (i.e., *ab*) will be significant. For statistical analysis of mediation, bootstrapping (re-sampling with replacement) is used to create a 95% confidence interval estimating *ab.* If the confidence interval does not include 0 then we can assume with 95% confidence that the indirect effect is different from 0 and is therefore significant (MacKinnon, Lockwood, & Williams, 2004).

Each path in a mediation model should be examined. As discussed above, there is already evidence that the criminal thinking and the other risk factors in the RNR model predict behavior problems (paths b and c, respectively). Thus, the final path to examine is path a, the relationship between other risk factors and criminal thinking. Peer associates and family relationships will be focused on here because they are more likely to be present in community youth, as compared to some other risk factors such as antisocial history, antisocial personality, or substance use (Hann, 2001). First, a number of past studies indicate that spending time with pro-criminal associates

could also increase an individual's level of criminal thinking (Walters, 2015; Walters, 2016a; Walters, 2019a; Whited, Wagar, Mandracchia, & Morgan, 2017). In addition, inconsistent parenting has been linked to criminal thinking (Rode, 2014). This is specifically true for insecure attachment and proactive criminal thinking (Walters, 2019b). Finally, in college students, there is evidence that criminal thinking is related to history of their parent's parenting styles (Gonzalez, Mandracchia, Nicholson, & Dahlen, 2014).

There is limited literature on the relationships between friends or parenting styles on criminal thinking in community youth. If criminal thinking were to be a targeted variable for change in treatment, it would be beneficial if it also impacted the other relationships between risk factors and behavior problems. Therefore, it is crucial to understand if criminal thinking may mediate those relationships in this population.

Study Goals

As our understanding of criminal thinking deepens, the next step is to examine how it may generalize to other samples. If it does generalize to community youth samples, then criminal thinking may be used as a flag for early prevention or intervention. Moreover, it is crucial to understand how criminal thinking relates to other risk factors to fully appreciate the scope of impact for such interventions.

The first specific aim of this study is to examine the validity and reliability of the CTS in community youth.

- Hypothesis 1a. Item level analysis will show that items in the CTS (Texas Christian University Criminal Thinking Scale; Knight, Garner, Simpson, Morey, & Flynn, 2006) are appropriate for this sample. If items do not fit well for this sample, the total and revised

scales will be assessed in hypothesis 1b, to determine which version is best to use for further analyses.

- Hypothesis 1b. Convergent, divergent, and incremental validity will be examined next. Significant correlations between aggressive behavior and behavior problems with criminal thinking will support convergent validity of this measure, as has been done in prior studies (Dembo et al., 2007). Moreover, theoretically unrelated variables will not be significantly associated, lending support for divergent validity (e.g., anxiety, depression). Tests of the unique predictive validity of criminal thinking for behavior problems, above and beyond other risk factors such as psychopathy, parenting, prior drug use, and pro-criminal associates, will support incremental validity.
- Hypothesis 1c. Given that criminal thinking is one of the hypothesized mechanisms of change (a dynamic risk factor), and is often measured in intervention studies, it is important to examine its stability in community youth without intervention. Thus, test-retest reliability will be examined across time. Moderate to high levels of test-retest reliability will support the use of the CTS in intervention studies because that indicates significant changes in the CTS scores will more likely be due to true change as a result of the intervention, as compared to normal fluctuation in criminal thinking in youth.

The second primary aim of this study is to determine if criminal thinking is a mediating mechanism in predicting disruptive behavior in community youth.

- Hypothesis 2a. Spending time with pro-criminal associates who have high levels of criminal thinking will increase the individual's engagement in criminal thinking, resulting in more behavior problems (Walters, 2016a).

- Hypothesis 2b. Inconsistent parenting or other problems with the parent-youth relationship will result in an increase in criminal thinking as a form of rebellion, also resulting in more behavior problems (Gonzalez et al., 2014).

This study will inform practitioners in assessing criminal thinking as a predictor of behavior problems and using it as a measure of change in treatment. Understanding the aims presented here is a prerequisite to including criminal thinking as a target of treatment with community youth. Moreover, examining the temporal role of criminal thinking as a mediator can aid practitioners in determining targets for treatment in preventing future youth delinquency.

Chapter 2: Methods

Procedures

To collect data for this study, youth were asked to complete questionnaires online about their cognitions and behaviors at intervals of every four weeks for four time-points (parent report at the first and last time point, optional participation for points in-between). This interval allows sufficient time between time points, while attempting to maintain a relatively small window of time to reduce the likelihood of attrition. To reduce burden on the parents, maximize the number of youth who could stay in the study, and because analyses did not require parent report at these intermediary time points, parents were not required to complete survey measures at collection time points two and three. A summary of data collected across time is provided in Table 1. All data was de-identified with a randomized ID number to protect the identity of the youth. This study was approved by the Virginia Tech Human Research Protection Program (IRB # 18-718). The Research Electronic Data Capture program (REDCap; Harris et al., 2009; Harris et al., 2019) was the online system used to collect the data. It is an encrypted/secure web platform for building and managing online databases and surveys, hosted by the Virginia Tech Fralin Biomedical Research Institute.

During recruitment, some subjects appeared to be completing the questionnaires without reading the items (based on very short times to complete the measures and apparent random responding based on item review). In collaboration with the IRB, these subjects were contacted for follow-up and verification of identity. None of the suspected subjects complied with verification measures and thus the data for these cases was assumed to be invalid and removed from all analyses (n = 20). These invalid subjects are not included in any of the data reported here.

At that time, validation measures were implemented to screen out any other participants that appeared to not be fully reading the questionnaires (both retroactively, as applicable, and for all future participants). These measures included setting minimum completion times for each survey based on researcher self-timing for completion of surveys, the minimum time spent for the first 30 participants (who showed no signs of invalid responding), and one standard deviation below that group's mean. The second form of validation was implementing validity items. These validity items were spread throughout the surveys for both parents/guardians and youth. They were formatted to fit in with the surrounding items and not stand out to people who are trying to skip through the questionnaire without reading the items (e.g., If you are paying attention select "strongly agree'). No other participants were identified as fraudulently completing the questionnaires.

Population

Data was collected from youth in the community, recruited both locally and nationally, and completed online. Community service programs, libraries, and other youth programs across the nation were asked to display flyers, and notices were posted online and emailed for recruitment. The study recruited for youth between the ages of 14 and 18 and a parent or guardian to also complete measures. The study sought to recruit at least 30 male and 30 female youth with at least half of each gender in the moderate- and high-risk levels, as identified by the Youth Level of Service/Case Management Inventory (YLS/CMI) Brief Screener, which the parent or guardian completed at the beginning of the study (Campbell et al., 2014). This sample size is considered an acceptable number based on typical standards for hierarchical linear modeling (which recommends a minimum of 30 participants), and the Youth Level of

Service/Case Management Inventory was used to help to ensure a range of youth behaviors in the sample (Kreft, Kreft, & De Leeuw, 1998; Maas & Hox, 2005).

Measures

The *Texas Christian University Criminal Thinking Scales* (CTS; Knight et al., 2006) was administered to the youth. The CTS contains 36 items on a 5-point scale (Strongly Disagree to Agree Strongly). Initial validations of the scale indicated six subscales: Entitlement, Justification, Personal irresponsibility, Power orientation, Cold-heartedness, and Criminal rationalization. There is also evidence of convergent validity, internal consistency, and replication of the factor structure for use in juveniles involved in the criminal justice system (Dembo et al., 2007). In the present study, the scale was adapted to be appropriate for use with juveniles not incarcerated, as has been done in other studies (e.g., rewording "You are locked-up because you had a run of bad luck" to "You get in trouble because you had a run of bad luck;" Knight, Becan, Landrum, Joe, & Flynn, 2014).

The *Youth Psychopathic Traits Inventory* (YPI; Andershed, Kerr, Stattin, & Levander, 2002) is comprised of 50 items on a four-point scale ("Does not apply at all" to "Applies very well") with 10 subscales (Dishonest charm, Grandiosity, Lying, Manipulation, Remorselessness, Unemotionality, Callousness, Thrill-seeking, Impulsiveness, and Irresponsibility). It has been used with youth from ages 12 to 20, with good evidence of convergent validity and internal consistency (Andershed, Hodgins, & Tengstrom, 2007; Neumann & Pardini, 2014). The 10 subscales also form the three primary facets: grandiose-manipulative, callous-unemotional, and impulsive-irresponsible, but for the sake of parsimony only the total score will be used (Andershed et al., 2002).

The *Reactive-Proactive Aggression Questionnaire* (RPQ; Raine et al., 2006) is a 23-item self-report questionnaire that measures proactive and reactive aggressive behavior in individuals, originally created for assessment in children. Statements are rated on a 3-point Likert scale, where higher numbers are associated with a higher frequency of the situation occurring for the individual.

The *Patient Health Questionnaire* (PHQ; Kroenke, Spitzer, & Williams, 2001) is a self-report questionnaire that assesses each of the nine criteria for depression. Each criterion is ranked on a 4-point Likert scale, with higher scores associated with more frequent occurrence of the symptom. The PHQ-9 has been shown to have strong reliability and validity in measuring depression severity (Kroenke et al., 2001).

The *Measures of Criminal Attitudes and Associates* (MCAA; Mills, Kroner, & Forth, 2002) asks four questions about the respondents four closest peers as well as 46 items about antisocial attitudes, including those oriented towards peers, in which the respondents either "agree" or "disagree." This measure has shown to be a reliable and valid measure of antisocial associates and attitudes (Mills, Kroner, & Hemmati, 2004).

The *Alabama Parenting Questionnaire* (APQ; Frick, 1991) was administered to identify if parenting styles impact youth outcomes. It includes 42 items total on a five-point scale. It has been validated for use with parents of adolescents with a set of four factors: positive and involved parenting, parental monitoring (higher scores related to poorer monitoring), discipline practices (i.e., types of discipline such as spanking, time out, etc.), and discipline process (i.e., letting out of punishment, inconsistency; Zlomke, Lamport, Bauman, Garland, & Talbot, 2014).

The *Youth Level of Service/Case Management Inventory* (YLS/CMI) Brief Screener (Campbell et al., 2014) was administered to the parents at the beginning of enrollment to

estimate risk level, based on three categories (i.e., low, moderate, and high risk). The full version of the YLS/CMI (Hoge & Andrews, 2002) is cited in meta-analyses as having good predictive accuracy (Olver, Stockdale, & Wormith, 2009; Schwalbe, 2007). The brief version has 10 items, scored as yes or no, and was derived based on items from the full version that best predicted two-year recidivism. In a validation study, the brief YLS/CMI demonstrated good reliability (alpha = .87) and a similar or better Area Under the Curve (ratio of true positives to false positives) compared to the full length YLS/CMI (Campbell et al., 2014).

Parents also completed the *Child Psychopathy Scale* (CPS; Lynam, 1997), which is a validated 52-item parent report of psychopathy rating on a dichotomous scale (i.e., yes or no; Lynam et al., 2005). It is typically divided into two factors, one focused more on callousness, egocentricity, and manipulation of others, while the other encompasses the more antisocial features of psychopathy, however, for parsimony only the total score will be used (Bijttebier & Decoene, 2009; Masi, Milone, Brovedani, Pisano, & Muratori, 2016).

Next, parents were asked to complete the *Child Behavior Checklist* (CBCL; Achenbach & Rescorla, 2001). The CBCL is a parent-report instrument commonly used to assess psychopathology in youth. It is made up of 113 questions, scored on a three-point scale (0=absent, 1= occurs sometimes, 2=occurs often), and then converted to a standardized t-score. The time frame for item responses is the past six months. Notable subscales that will be a focus of this study include the following: anxiety, depression, thought problems, rule breaking, and conduct disorder.

Finally, the *demographics and background* information about the youth was collected from the parents. Parents were asked to report on contact with child protective services (which may be a proxy for history of reported abuse), mental illness, prior drug use, and prior arrests or

convictions. These items were asked again at the end of the study to identify any change in status.

Analyses

Hypothesis 1a

First, item level analysis was conducted to identify which items are a good fit for this sample, using measures of discrimination and "difficulty." Meyer (2014) defines item discrimination as the usefulness of an item to identify which respondents have high versus low score (in this case criminal thinking), and item difficulty as the likelihood of respondents endorsing the item. Meyer (2014) suggests selecting items with moderate discrimination values and large item variances (e.g., a variety of different difficulty levels). He also notes that polyserial correlation provides more stability across groups of examinees, and thus this setting was selected for analyses. In the item level analyses all waves of data collection were assessed to see if the patterns for individual items persist. As mentioned above, after completing item response theory analyses it is necessary to also analyze the psychometric properties of the new scale (Boateng et al., 2018). Since the original measure has never been validated with the population of focus in this study, both the original measure and the revised were examined in the psychometric analyses described below. Between the full score and revised CTS, the version of the measure with the best support for convergent, divergent and incremental validity was used in analyses for hypothesis 1c, 2a, and 2b.

Hypothesis 1b

Next, convergent validity was assessed by examining the CTS full scale and revised scale correlations with the MCAA, psychopathic traits (youth and parent report), aggression (Reactive-Proactive Questionnaire), and the following Child Behavior Checklist scales: Rule-Breaking

Behavior, Oppositional Defiant Problems, and Conduct Problems (Dembo et al., 2007). Prior studies of criminal thinking have used anxiety, somatic complaints, depression, and schizophrenia symptoms to test discriminant validity (Walters & Geyer, 2005). Therefore, in this study the Patient Health Questionnaire 9A and the following scales from the Child Behavior Checklist were used to test discriminant validity: Anxiety Problems, Somatic Problems, Depressive Problems, and Thought Problems. Then, to test incremental validity, CTS (full scale and revised), psychopathy, parenting, and pro-criminal associates were entered into regression analyses to determine the unique predictive validity of each on the following outcome measures: proactive aggression, reactive aggression, rule-breaking behavior, oppositional defiant problems, and conduct problems.

Hypothesis 1c

To assess the stability of CTS in community youth without intervention, test-retest reliability was examined across time points. Specifically, bootstrapped correlations and t-tests for each subscale and total score of the CTS measure were examined for the strength of the relationships between two time points, and for significant differences in the mean. These tests were completed for comparison between all data collection time points (i.e., set 1 and 2, set 1 and 3, set 1 and 4, set 2 and 3, set 2 and 4, and set 2 and 3). Finally, although Pearson's correlations are sufficient for test-retest reliability, the intra-class correlation (ICC) may also be used in cases with more than two sets of data collection, and thus the ICC was also computed (Leppink, & Pérez-Fuster, 2017). Specifications for the ICC include 2-way mixed effects because data represents multiple scores from the same rater, and absolute agreement because there should be agreement between measurements (Koo & Li, 2016; Rousson, Gasser & Seifert).

At least 30 participants with at least 3 sets of data collection are recommended, and the present study fits those criteria (Koo & Li, 2016).

Hypotheses 2a and 2b

Next, to address hypotheses 2a and 2b, two different types of mediational analyses were completed. Since the same analyses are used for both hypotheses 2a and 2b, descriptions will be combined as needed, for clarity and to be concise. The first type of mediation was tested with multilevel modeling, examining indirect within-person effects. This type of modeling was selected because the study employed repeated measures which were nested within persons, and because multilevel modeling allows for missing data, which capitalizes on the full sample that began the study with the first wave of data collection.

When using multilevel modeling, two different types of models were analyzed. The first is represented in Figure 4, with MCAA friends represented at level 2 because it is a constant for each youth, as it was only measured at time 1. This variable is not necessarily stable but was only measured at time 1 to reduce the burden on participants. The other model type is represented in Figure 5, where all variables are considered to be at level 1 because each of them include repeated measures. In addition to MCAA friends, variables from parent and youth report on the APQ were also tested as independent variables. The following variables were tested as dependent variables: youth report of proactive and reactive aggression, and parent report of rule breaking, Oppositional Defiant Disorder (ODD) behaviors, and conduct problems. In all analyses the mediator was CTS and the wave of data collection (i.e., set 1-4) was included as a covariate to control for time. These analyses were completed with the use of *MLmed* (Hayes & Rockwood, 2020), which is an SPSS macro, based on procedures by Bauer, Preacher, and Gil (2006). The

significance of the indirect effects was estimated with Monte Carlo bootstrapping estimates (10,000) and presented with a 95% confidence interval (Preacher & Selig, 2012).

For the second type of mediation analysis the sample size was reduced to the 54 youth who completed the entire study. This could not be avoided because the statistical analyses require list wise deletion, whereas multilevel mediation allows for incomplete data. To determine if there were significant differences between the sample used for the multilevel mediation and the reduced sample for the second type of mediation, an attrition analysis was completed. Independent samples t-tests were completed comparing the 10 youth who dropped out of the study to the 54 youth who stayed in the study, examining all descriptive, dependent, and independent variables.

The final analyses involved replicating the above mediation tests, but instead of using multilevel modeling, a "causal" model was tested. It is important to note that although the model is called "causal," it is only the term used in the statistical literature and package. That is, rather than using the repeated measures as level 1 variables, the independent variable was tested for indirect effects through CTS at wave 1, 2, 3, and 4 in predicting the dependent variables listed above. However, the theoretical model being tested is not truly causal because there was no manipulation of the independent variable(s) in this study. For clarity, I will refer to this model as "temporal mediation," because the purpose of testing this alternative analysis is to better account for the temporal precedence of CTS responses. Bootstrapped 95% confidence intervals (CI) of the indirect effect were computed in SPSS with 10,000 samples using PROCESS (Model 6; Hayes, 2013).

Chapter 3: Results

The sample size enrolled in the study was 64 youth and parents/guardians (sample with attrition described in Table 2). In the second wave of data collection 48 parents and 59 youth participated, then in the third wave 45 parents and 55 youth participated. Missing data from parents at intermediary waves of data collection did not reduce the sample size because analyses were not reliant on that data. Finally, there were 54 parent/guardians and youth who participated in the final wave of data collection. The original sample (i.e., participating at wave 1) was comprised of 51.6% male, 90.6% white youth. The average age was approximately 16 years old (range 14 years - 18 years and 7 months).

Next, additional demographics were examined, especially because some were hypothesized as dependent variables. Those included if there was child protective services (CPS) contact or drug use by the youth. Only two parents reported prior CPS contact and one indicated their youth had prior drug use. Due to the limited number of responses in these variables they will not be appropriate for analyses and instead analyses will rely on parent and youth report of disruptive behaviors or aggression.

Other notable demographics include that 1 youth was retained and 14 parents (21.9%) reported that their youth has at least one psychiatric diagnosis. These diagnoses included: attention deficit/hyperactivity disorder (12.5%), anxiety (general, social, phobias, 9.38%), and depression (4.69 %). Some youth had more than one diagnosis (and other diagnoses present in only one or two youth were learning disorder, developmental disorder, and ODD). In general, these rates appear to be similar to the general population (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Merikangas et al., 2010). Finally, 62.5% of the parents/guardians were married,

12.5% were divorced or separated, and the remaining 26.6% included single mothers, mother with a stepfather, or some other family makeup (including adoptive or foster parents).

Finally, it is important to be able to interpret the raw scores for the measures in this study. Means and standard deviations (SD) for the CTS, MCAA, and RPQ are presented in Table 3, and compared to other samples from the literature (Dembo et al., 2007; Euler, Steinlin, & Stadler, 2017; Knight et al., 2006; O'Hagan, Brown, Jones, & Skilling, 2019; Raines et al., 2006). The results for the CBCL scores are presented as t-scores, and therefore are already standardized. Means and standard deviations were not available for the APQ with the chosen factor structure. Notably, criminal thinking scores and aggression scores are generally at least 1 SD below that of the justice-involved populations.

Hypothesis 1a

In item level analyses, items were first assessed for item discrimination. Negative item discrimination is indicative of significant problems with the item and thus it should be considered to be removed. As displayed in Tables 4a and 4b, item 12 had a negative item discrimination in sets 1, 3 and 4, as well as very low item discrimination in set 2. Similarly, item 15 demonstrated negative item discrimination in sets 2, 3 and 4, and very low item discrimination in set 1. Meyer (2014) suggests examining item details, removing items, and retesting in an iterative manner. When examining the results for alpha if the item was deleted, removal of item 12 (as compared to item 15) would result in higher alpha in all sets except for set 2. Therefore, item 12 was the first item to be removed. Next, as seen in Tables 5a and 5b, item 15 was still presenting with negative item discrimination and thus it was removed. The results with both items 12 and 15 removed are presented in Tables 6a and 6b. In those results, item 1 has negative item discrimination in set 2 and item 6 in set 4. Item 1 was selected to be

removed because set 2 is a slightly larger and varied sample, as compared to set 4 (because of attrition), and therefore set 2 is likely more representative of the larger population.

Tables 7a and 7b present results with items 1, 12 and 15 removed. As item 6 continued to show negative discrimination (now in sets 3 and 4), it was removed. Next, item 27 was removed because it demonstrated negative discrimination in set 1 (as seen in Tables 8a and 8b). Finally, item 17 was removed for the same reason (as seen in Tables 9a and 9b). The final results of item analyses are displayed in Tables 10a and 10b, with all positive item discriminations. Item endorsability (difficulty) is somewhat lower than would be ideal, with the following ranges for each set: set 1, 1.48 to 3.42; set 2, 1.66 to 3.58; set 3, 1.66 to 3.3; and set 4, 1.57 to 3.41. Since the range of responses go from 1 to 5, it would have been ideal to have more items with higher endorsability (i.e., around 4). Also of note, these revisions (removing the items) completely eliminated the cold-heartedness subscale of the measure.

Hypothesis 1b

Next, correlations were examined for the relationships between criminal thinking styles and other variables, as the first step in identifying the validity of the measure (correlations are presented in Tables 11a, 11b, 11c and 11d). First, the CTS total scores significantly correlated with the MCAA score, as would be expected (full CTS $r = .53$; revised CTS $r = .48$). There is greater support for convergent validity for the CTS full-scale total score as compared to the revised score, because the full-scale score significantly correlates with psychopathy scores, rule breaking, conduct problems, proactive aggression, and reactive aggression. On the other hand, the revised scale does not correlate with rule breaking or conduct problems. In addition, although it was predicted that criminal thinking would relate to ODD problems, none of the measures of

criminal thinking (i.e., CTS full score, revised score, or the MCAA) were significantly correlated with ODD problems.

Divergent validity was not altogether consistent. While there was no significant relationship with either full or revised CTS scores and anxiety or thought problems, depression was moderately correlated with CTS full-scale score (PHQ r = .36; CBCL depression scale r = .26) and the revised score (PHQ r = .34). This was contrary to our hypotheses. However, the MCAA total score was similarly correlated with both measures of depression (PHQ r = .25; CBCL r = .33), so this significant finding is not necessarily out of line with other measures of criminal thinking.

Incremental validity was also considered in this study, examining if the measurement of CTS explains behavior problems above and beyond other predictors.[1] Predictors of behavior problems were psychopathy traits, parent-child relationship, and antisocial friends. Behavior problems were characterized by the following variables: CBCL Rule breaking, Conduct Problems, and ODD problems, as well as RPQ proactive and reactive aggression scales. Since psychopathy traits and parenting styles were reported by both parents and youth, the reporter for those variables was selected based on the reporter for the dependent variable (e.g., parents reported on the CBCL, so parent report of psychopathy traits and parenting behaviors would be used).[2] The initial results for the full model are presented in Table 12, but the models were reduced in an iterative fashion.

[1] The analyses were repeated with the MCAA total score of criminal thinking in place of the CTS. Results followed a similar pattern to those presented here.
[2] The analyses were completed again with the opposite rater replacing the matching rater (e.g., youth report of psychopathy with parent report of CBCL behavior problems). The results of these analyses followed the same patterns of results presented in detail here.

Psychopathy traits and CTS were moderately to highly correlated (revised CTS: YPI r =.54, p<.01; CPS r =.26, p <.05; full CTS: YPI r =.62, p <.05; CPS r =.31, p <.05), therefore there is a large amount of shared variance between these variables in the regression model and it may be beneficial to examine the model without psychopathy traits included. Table 13 represents the model when the psychopathy score is removed from analyses. Finally, positive parenting and parent monitoring were not correlated with any behavior problem outcomes, and thus were the last two variables to be removed from the model, with results displayed in Table 14.

In the first model there were no significant predictors of proactive aggression. Once psychopathy was removed, the revised CTS score then significantly predicted proactive aggression (b = .06, p = .04). Results did not change for model 3. In respect to reactive aggression, in the full model the full CTS score significantly predicted reactive aggression (b = .11, p = .04) above and beyond psychopathy traits, friends, and youth report of parenting practices and processes (the revised score had a similar trend but was not significantly predictive at the p <.05 level). This pattern of results persisted in model 2 and model 3, with both the revised and full-scale scores significantly predicting reactive aggression, over and above friends and parenting styles (b = .13 to .14, $p \leq .01$).

The next three sets of analyses focused on the CBCL behavior scales. Parent rated psychopathy scores were the significant predictors of rule breaking, conduct problems, and ODD problems in the first model, regardless of scoring for the CTS. When psychopathy scores were removed (in model 2), only the full-scale score CTS was predictive of rule breaking (b = .11, p = .04). Then, when positive parenting and monitoring were removed from the model (i.e., model 3), parenting practices were significant predictors of rule breaking (as was full-scale score CTS and parenting processes, see the bottom half of Table 14). On the other hand, the only significant

predictor of conduct problems was the full-scale score CTS (b = .11, p = .048; see bottom of Table 14). MCAA Friends predicted lower levels of ODD behavior in the final model when the full-scale score CTS was included (b = -.11, p = .047).

Hypothesis 1c

The next analysis completed was regarding the test-retest reliability of the CTS. Results are presented in Table 15. With one exception, there are no significant differences between means across time. The one exception is the measure of Entitlement across sets 1 and 3. Regarding the correlations, the conventional interpretation was offered by Cohen (1988) as follows: correlations around .1 are small, .3 are moderate, and those around .5 are large. There is not a standard measure for interpretation for test-retest reliability, because agreement between measures depends on what is being assessed, as well as the time between measurements. However, Hemphill (2003) compiled a total of 380 meta-analytic studies reporting correlations and suggested the following guidelines regarding where a correlation would fall in comparison to the distribution of correlation coefficients: below .2 is in the lower third, .2 to .3 is in the middle third, and above .3 is in the upper third. Thus, the correlations presented in Table 15 are generally moderate to large, or in the upper third of the distribution of most correlations. This suggests there is evidence for consistency in measurement of CTS across time.

Moreover, the ICCs were also analyzed and presented in Table 16. Two different guidelines are available in the literature for interpretation, provided by Cicchetti (1994) and, alternatively by Koo and Li (2016). The ICCs in this study for PO, PO(r), and PI would all be considered “fair” by Cicchetti (1994), with all remaining subscales and total scores considered “good.” Similarly, by Koo and Li’s (2016) standards, all ICCs fall in the moderate category.

Hypotheses 2a and 2b

As in the methods section, the results for hypotheses 2a and 2b will be combined in order to be succinct. The multilevel mediation results are summarized in Tables 17 and 18, with the confidence interval (CI) for the indirect effect in the last two columns. According to the HLM analyses, criminal thinking mediates the relationship between MCAA friends and proactive aggression (indirect effect *b* = .043, 95% CI .004 to .099), as well as reactive aggression (indirect effect *b* = .064, 95% CI .006 to .147).

In addition, criminal thinking mediates the relationship between parent discipline practices (youth report) and reactive aggression (indirect effect *b* = .037, 95% CI .001 to .085). On the other hand, criminal thinking also mediates a negative relationship between positive parenting (youth report) with reactive aggression (indirect effect *b* = -.029, 95% CI -.057 to -.008), rule breaking (indirect effect *b* = -.004, 95% CI -.097 to -.007), and conduct problems (indirect effect *b* = -.037, 95% CI -.085 to -.004). That is, when youth think that their parents act in a positive manner, they have lower CTS, resulting in fewer negative outcomes. Next, youth perception of poor parent monitoring predicted higher levels of reactive aggression (indirect effect *b* = .033, 95% CI .007 to .068), rule breaking (indirect effect *b* = .054, 95% CI .004 to .124), and conduct problems (indirect effect *b* = .053, 95% CI .005 to .120) through CTS. Similarly, parent report of monitoring predicted increased reactive aggression (indirect effect *b* = .040, 95% CI .004 to .090) and conduct problems (indirect effect *b* = .053, 95% CI .0001 to .132) through CTS (Table 17).[3]

[3] The relationships that were not replicated in the temporal mediation were retested via multilevel mediation by switching X and M variables (for the one level mediation, retesting was not possible with the two-level mediation). All results were not significant, lending support to the mediation models which were originally hypothesized.

The sample size for temporal mediation analyses was reduced to the 54 youth who completed the entire study due to listwise deletion. Attrition analyses examining any specific features of the youth who dropped out of the study revealed three characteristics of note. First, the 10 youth who dropped out of the sample were all white; t(53)=2.57, p = .01 (equal variances not assumed based on Levene's test). Next, the youth who dropped out had higher levels of reactive aggression (M = 13.70, SD = 6.33 vs M = 7.23, SD = 4.95); t(62) = -2.86, p = .01. The youth who dropped out also had lower levels of anxiety as reported by the parents on the CBCL (M = 53.20, SD = 6.16 vs M = 59.76, SD = 9.44); t(17.95) = 2.81, p = .01 (equal variances not assumed based on Levene's test). These results were consistent with 1000 bootstrapped samples.

The analyses were then repeated with temporal mediation, as displayed in Figure 6, with significant results presented in Tables 19 and 20. Results that remained the same as those for the multilevel mediation are as follows: MCAA friends (indirect effect b = .039, 90% CI .002 to .162) and parent monitoring (youth report; indirect effect b = .035, 90% CI .002 to .145) both indirectly predicted reactive aggression through CTS (a comparison of both mediation analyses is presented in Table 21).

However, some analyses that were not previously identified in the multilevel mediation, displayed significant indirect effects in the temporal mediation. Those included: parenting processes (youth report) predicted both reactive aggression (indirect effect b = .085, 90% CI .015 to .281) and proactive aggression (indirect effect b = .045, 90% CI .005 to .158), and parent monitoring (youth report) predicted proactive aggression (indirect effect b = .018, 90% CI .001 to .078).

Chapter 4: Discussion

Criminal thinking styles have been assessed in adults and youth involved with the criminal justice system, but the literature has not yet examined the possibility of such assessment in community youth. Early identification and intervention could reduce or prevent behavior problems and possibly later criminal behavior. Thus, this study first sought to examine the measurement of criminal thinking in community youth. Then, with a mind toward intervention and reducing criminal thinking styles, this study examined the relationships between criminal thinking, behavior problems, and other risk factors. Specifically, this study tested if criminal thinking mediates the relationship between criminal associates or parenting with behavior problems. Evidence for this mediation supports criminal thinking as a valuable target for treatment because it could change outcomes by focusing on one variable, even when other risk factors are present.

Hypothesis 1a

One aim of this study examined how the CTS functioned at an item level as the first step in validating its use in community youth populations. The item level analyses identified six items that were not a good fit for measuring CTS in this sample. Five of those six items were reverse-scored and made up the cold-heartedness subscale. However, within the present study, the revised CTS total score (i.e., removing those six, poorly fitting items) demonstrated lower convergent validity than the full score, suggesting that the full score is a better estimate of criminal thinking. This indicates that although cold-heartedness is not characteristic of most community youth, it is an important feature of criminal thinking that predicts behavior problems. More interpretation of the cold-heartedness scale is provided after considering the item-level endorsability.

Results from the item level analyses also presented with less than ideal item endorsability (or difficulty). This suggests that participants in the study sample were not as likely to select "agree strongly" as they were to select "disagree strongly." This is not surprising, as it would be expected that a non-justice involved sample would be less likely to strongly endorse criminal attitudes. Moreover, similar patterns have been observed in other studies comparing prisoners to probationers, with probationers less likely to strongly endorse criminal thinking (Vaske et al., 2017; Walters, 2014). Even with the discrepancy in endorsement, the nature of criminal thinking was consistent across community and correctional sample in prior studies, and there is evidence that similar patterns occur in college students (McCoy et al., 2006; Walters, 2014). Due to the fact that there was evidence for validity (discussed below), it appears that this pattern of lower endorsement, but similar relationships to dependent variables, extends to community youth.

In respect to cold-heartedness in the broader literature, the term cold-heartedness has also been associated with psychopathy and represents a significant overlap between these two constructs. Cold-heartedness in one psychopathy measure does not load onto the higher order factors in factor analytic studies and as a result has, at times, been omitted from analyses (Berg, Hecht, Latzman, & Lilienfeld, 2015). However, the most recent consensus in the field finds a place for cold-heartedness, or "meanness," within the psychopathy construct (Patrick, 2010). Notably, one recent study included cold-heartedness as a measure of criminal thinking and a measure of psychopathy, concluding that cold-heartedness is "a core feature of *psychopathy*, even in a college sample" (emphasis added; pp. 187; Fix & Fix, 2015).

In the original validation study of the CTS, the cold-heartedness scale was not significantly related to three other subscales, which suggests cold-heartedness is distinct from the other types of criminal thinking styles (Knight et al., 2006). However, research suggests that

cold-heartedness (as a standalone measure) significantly correlates with proactive criminal thinking, giving some support to its inclusion in criminal thinking constructs (Walters, 2016b). Notably, in a recent intervention study, cold-heartedness and entitlement were the two scales to show the least amount of change (Warner, Conley, & Murphy, 2018). Moreover, levels of cold-heartedness have been shown to vary between criminal and community populations, with community samples showing lower levels of cold-heartedness (Taxman, Giuranna, Rhodes, & Dumenci, 2011). Taken together, this data suggests that the cold-heartedness scale may be part of a continuum, with higher levels related more closely to an individual's personality style (i.e., psychopathy, more trait-like) and more moderate elevations related to thinking styles (i.e., more state-like).

Recommendations for scale refinement focus on the cold-heartedness scale. A confounding factor to consider here is that the cold-heartedness scale is comprised of exclusively reverse scored items, as seen in psychopathy-related measures of cold-heartedness. In addition, only one reversed item was retained in the revised scale. Therefore, it could be that the reverse scoring influenced the fit of the items in addition to the content of the items, as suggested by other researchers (e.g., Berg et al., 2015). Future research should strive to create some items that do not require reverse scores. In addition, researchers should examine the use of cold-heartedness as it connects psychopathy and criminal thinking, considering if it could be a sub-construct that operates on a continuum. Finally, researchers could consider creating new items which tap criminal thinking and cold-heartedness at lower levels, which would be more likely to be endorsed by community samples.

Hypothesis 1b

As referenced above, the next aim of this study was to examine the validity of the CTS. Convergent validity refers to the expectation that variables which are conceptually related should be significantly statistically correlated. There was more support for the full-scale CTS score as compared to the revised score (after removing the items identified in the item level analysis). The full CTS score was significantly correlated to measures of psychopathy, behavior problems, and aggression, which are all conceptually related, as identified in past studies (e.g., Dembo et al., 2007).

The one variable with no relationships to either measure of criminal thinking was the scale for ODD problems. The null results of this study are in contrast to prior evaluations in incarcerated youth. However, the study by Dembo and colleagues (2007) specifically examined youth with diagnoses of ODD, not parent-reported symptomology as in the present study. This difference in measurement may partially explain the difference in results. On the other hand, a different study identified that ODD in adolescent males acted as a protective factor against future recidivism (Boduszek, Belsher, Dhingra, & Ioannou, 2014). Boduszek and colleagues (2014) offered a number of hypotheses for the negative relationship between ODD behaviors and recidivism, including that ODD behaviors are less central to future criminal behavior. In the end, they summarized that overall, more research is needed. Further discussion of the relationship between CTS with ODD is provided below, in respect to incremental validity.

There was generally good support for divergent validity as well (i.e., conceptually unrelated variables were also unrelated). The relationship between depression and CTS presents the exception. This significant relationship was not initially hypothesized, and there has been no significant relationship between these variables in other studies (e.g., Walters & Geyer, 2005).

However, there is some precedence in the literature for this type of relationship. Especially in youth, internalizing and externalizing behaviors commonly co-occur, likely due to poor self-regulation and impulsivity (Eisenberg et al., 2001). Thus, results from this study support the suggestion that self-regulation and thinking patterns are transdiagnostic in nature, relating to a number of psychological difficulties (Beauchaine & Thayer, 2015; Delk, Spangler, Guerra, & White, In Press).

The third stage of the validation process examined incremental validity of CTS, when including other predictor variables. That is, examining if CTS has unique variance in predicting outcome variables, above other predictor variables. If it does not, then CTS would not be a useful variable to measure because the other predictor variables would be sufficient. Most notably, CTS was not a robust predictor compared to psychopathy traits for parent-reported behavior problems. This is discrepant to results in federal inmates which demonstrated that both psychopathy and criminal thinking are incrementally valid predictors of incident reports in prison (Walters & Mandell, 2007). Thus, at least in this sample, it appears that psychopathy is a better predictor of the parent-reported behavior problems than criminal thinking.

On the other hand, the CTS score is consistently a predictor of reactive aggression in incremental validity analyses. Moreover, the revised score for CTS is a significant predictor of proactive aggression when psychopathy is not included, however, this was not true for full CTS score. This was surprising because the bivariate correlations more strongly supported validity of the full CTS score instead. As discussed above, the revised CTS score was mostly made by removing items related to cold-heartedness. Three of the five remaining subscales were specifically proactive criminal thinking scales (Knight et al., 2006), which may explain why the revised CTS score is more closely related to proactive aggression, as compared to the total score.

An unexpected outcome of the incremental validity analyses is that antisocial friends negatively predicts ODD behaviors in the third model. That is, having antisocial friends relates to lower ODD behaviors as reported by parents. There is some literature that suggests that oppositionality to peers is different from that towards adults, which may partially explain why they are not positively related (Taylor, Burns, Rusby, & Foster, 2006). In addition, the relationship could be indicative of the well-established relationship between ODD problems and peer problems, such that perhaps youth with more friends in general are less likely to have parents report ODD problems (Pardini & Fite, 2010).

Finally, it should be considered that these results overall are not necessarily unidirectional. That is, although results suggest that discipline practices (i.e., types of discipline) and inconsistent discipline process are predictive of rule breaking behavior, it could also be bidirectional. For example, greater levels of rule breaking promote greater levels of discipline and inconsistency in discipline (e.g. Choe, Olson, & Sameroff, 2013).

Hypothesis 1c

The last stage of the validity testing focused on the stability of the CTS over time. The only subscale that had some fluctuation in stability was Entitlement. This suggests that entitlement may be somewhat mood, or situationally dependent for youth. Otherwise there was generally good stability and test-retest reliability across the total score and all other subscales. Prior work with young adult males and use of the PICTS has shown good reliability and stability (Palmer & Hollin, 2004). These results provide evidence that the CTS can be used as a reliable measure of criminal thinking in future intervention studies with community youth.

Results show that without implementing interventions, the CTS scores remain stable across at least a four-month time span. Therefore, if significant change in CTS is detected during

an intervention program (typically 12 weeks), the change is likely attributed to true change from the intervention, and not natural fluctuation of the construct. However, future intervention studies should strive to include control or treatment as usual groups to verify these assumptions.

Hypothesis 2a

When examining the results related to the indirect effects of friends on dependent variables there was consistent support that antisocial friends predicts increased reactive aggression via CTS. That is, within the multilevel mediation analysis, friends indirectly predicted reactive aggression via CTS throughout the study. Moreover, the temporal mediation also supported this relationship. Specifically, friends at time 1 predicted CTS at time 2, which predicted CTS at time 3, and then reactive aggression at time 4. Thus, during the months in between time 1 and time 4, intervention in criminal thinking styles could be attempted to try to reduce the level of reactive aggression later.

On the other hand, friends indirectly predicted proactive aggression in the multilevel modeling, but not in the temporal mediation analysis. There are three possible explanations for this difference. The first possible reason is that the significance of this effect size was less robust as compared to the effect for reactive aggression (MCLL = .004 versus MCLL .006), and therefore the sample size and available power in the temporal mediation precluded detection of significant effects. The second possibility is that the relationship is not causal. Only a study implementing changes to independent variables (e.g., friends or criminal thinking), would be able to truly test this hypothesis for causality. The third possible explanation is that some of the youth that were more prone to proactive aggression dropped out of the study before they reached time point 4. Those youth would have been excluded from the temporal mediation analysis. This follow-up hypothesis was quickly tested with an independent samples t-test comparing levels of

proactive aggression across waves of data collection. The t-test was non-significant, therefore suggesting there was not a meaningful difference in the mean level of proactive aggression for the sample from set 1 as compared to the remaining sample in set 4 (t = .04, p = .97, with similar results for analyses with 1000 bootstrap samples). Thus, the indirect effect was either not strong enough to be detected in this sample, or it was not in fact causal in nature.

To summarize, the impact of friends on youth aggression through criminal thinking has strong support for reactive aggression, and possibly impacts proactive aggression. The distinction between the impact of friends on aggression as compared to rule breaking or other behavior problems has been recently noted in another study (Kornienko, Davila, & Santos, 2019). However, Kornienko and colleagues (2019) did not examine criminal thinking. Walters (2016a) noted similar patterns between friends and offending, but those were present in a justice-involved sample of youth and did not examine aggression. Thus, the present study identifies that criminal thinking may be a target of intervention for aggression in community youth who associate with antisocial peers. Notably, other studies also suggest ways to influence who the youth associates with, such as through positive role models and parenting interactions (e.g., Walters, 2016c, 2016d).

Hypothesis 2b

The final hypothesis examined the role of parent relationships with youth. The relationship that was significant across both forms of mediation analyses was parenting monitoring (youth report) indirectly predicting reactive aggression. Monitoring relates to youth perception that the parent does not monitor their behaviors very closely. There is prior work supporting the relationship between both harsh discipline and poor parental monitoring with externalizing behavior (Pinquart, 2017). The present study is unique in that it specifically

connects poor monitoring and harsh parenting to reactive aggression via criminal thinking in a community sample of youth. Therefore, if the professional working with a youth cannot influence the parent directly, they may instead attempt to influence the youth's criminal thinking to reduce reactive aggression.

Next, there were some results that were significant only for the casual mediation analyses, including: discipline processes (youth report) indirectly predicts reactive aggression, whereas discipline processes and poor monitoring (both youth report) indirectly influence proactive aggression. Discipline processes are defined as the likelihood that a parent is inconsistent in discipline. Prior research suggests that inconsistent parenting can result in increased behavioral problems (in this case, increases in both reactive and proactive aggression), possibly as a way to elicit more predictability in responses to their negative actions (see Stormshak, Bierman, McMahon, & Lengua, 2000 for a review). There is also some research connecting inconsistent parenting to criminal thinking (Rode, 2014).

Other research suggests that, low parental monitoring is related to limited parental attachment (Kerns et al., 2001), which has been shown to be strongly related to proactive aggression (Marcus & Kramer, 2001). The CTS level could also be related to problems with parental attachment, thus allowing the youth to develop these unhelpful thinking styles. The importance of these findings is that, regardless of the associated variables and pathways, criminal thinking is a single mechanism that is shown to partially connect problematic parenting to negative outcomes, thereby giving a point of focus to professionals seeking to intervene in these processes.

The results that were significant for the multilevel mediation but not the temporal mediation analysis warrant brief discussion as well. Notably, there is greater power for

multilevel mediation analyses because of the ability to use incomplete data collection, rather than requiring listwise deletion. Moreover, the larger sample includes 10 youth who were, on average, more prone to reactive aggression and less prone to anxiety, as compared to the sub-sample that completed the entire study and were used in the temporal mediation analysis. The results that were significant for the multilevel mediation included the following: parenting practices (youth report) predicting reactive aggression; positive parenting (youth report) predicting reduced reactive aggression, rule breaking, and conduct problems; parent monitoring (youth report) predicting rule breaking and conduct problems; and parent monitoring (parent report) predicting reactive aggression and conduct problems.

Parenting practices (youth report) has to do with the variety of types of discipline used by parents. Higher scores suggest the parent uses a greater variety of discipline types, likely suggesting harsh discipline (e.g., corporal punishment in additional to limiting leisure time). In the literature, meta-analytic results show the strongest effects of poor parenting on aggression is attributed to harsh parenting styles (Piquart, 2017).

One possible explanation for the fact that some dependent variables were significant for multilevel mediation but not the temporal mediation could be that parent perception of their child does not change much over a four-month time frame. As reported above, the temporal mediation also lost 10 youth with slightly higher levels of reactive aggression as compared to the rest of the sample, which could also limit the replication of results in the temporal mediation. Finally, it could be that a positive parent relationship is not sufficient to reduce problem behaviors in a short time frame. However, as footnoted in the results, the exchange of X and M yielded nonsignificant results, which provides additional support for these mediation relationships.

Limitations and Recommendations for Future Work

Limitations of this study should be acknowledged. First and foremost, the sample size was smaller than would be ideal for a thorough validation study. This is an adequate initial validation, but future studies should aim to recruit a larger and more diverse sample. Specifically, the CTS was originally developed for use in an adult criminal population. Although it was selected because it covers both process and content of criminal thinking and showed some evidence of support for juveniles, it may be necessary for researchers to create a new measure that is specifically intended for this population. Thus, item rewriting, and retesting would be beneficial.

Future work should also aim to also assess youth that are referred for probation or have a greater range of behavior problems, to ensure that these results apply to youth entering into early intervention programs, who likely have somewhat higher levels of behavior problems as compared to this present sample. Another limitation is the lack of behavioral observations from outside sources. Teacher and peer reports of youth behaviors would be another avenue for data collection, including assessing the participant's peers to gain a more objective view of their levels of antisociality. Finally, collection of information relevant to the youth's socioeconomic status is warranted, given evidence that social disorganization and environmental strain (both related to socioeconomic status) relate to increases in antisocial behavior (Agnew, 1985; Shaw & McKay, 1942).

The premise of this investigation was to validate the CTS on a sample of community youth, with the aim to use the CTS in future treatment studies. To truly test the causality of criminal thinking, both criminal thinking and outcome measures need to be measured across time during an intervention study. As discussed, there are a few different mechanisms which could be

influencing the relationships between independent and dependent variables. Therefore, future work should seek to use the CTS in intervention studies and measure associated variables, such as parenting, antisocial associates, and other risk factors, to be able to control for their influence on youth thinking styles.

Conclusion

This study is the first to examine community youth criminal thinking styles as measured by the CTS. In examining item level fit for this measure, this study brought to the forefront the overlap between criminal thinking and psychopathy. Understanding how thinking styles relate with personality patterns is a huge undertaking, but it seems to be warranted to reduce the negative effects of these thinking styles, and thus should be considered in future work.

This study also offers preliminary evidence for convergent, divergent, and incremental validity. Notably, the relationship with depression in the analyses of divergent validity brings into question the role of emotion regulation and automatic negative thoughts. Transdiagnostic concepts such as these may be targeted in treatment, instead of specifically criminal thinking, and still produce significant improvements on outcomes.

In addition, incremental validity was not consistently robust to measures of psychopathy. That is, when psychopathy was included in the regression analyses there was not enough unique variance attributed to CTS to warrant the inclusion of this measure. The exception was for reactive aggression, which was uniquely predicted by CTS. This result also supports the suggestion mentioned above for investigating emotion regulation as a transdiagnostic concept, because it appears that there is a sense of poor self-control as related to this construct (thus the *reactive* aggression).

Overall, there is more to be learned in respect to the relationship between criminal thinking, psychopathy, and self-control or emotion regulation. In response to clarifying the

theoretical basis of these concepts, researchers would then consider creating new items and refining them for a community population, as outlined in the literature (e.g., Boateng et al., 2018; Morgado et al., 2018). Importantly, this study demonstrates that the CTS has adequate test-retest reliability. Therefore, when this measure is used in intervention studies, changes in the scores can be considered to be reliable. Thus, even though there is more ground to cover, at this time there is enough support for the CTS to be considered a fairly reliable and valid measure of criminal thinking with community youth.

The second primary aim of this study was to examine the relationships between criminal thinking and other risk factors, to determine if targeting criminal thinking in interventions would impact a number of relationships with behavior problems. This study provides evidence that criminal thinking is a mechanism indirectly connecting the influence of antisocial peers and poor parental monitoring to reactive aggression. Moreover, there is also some support via temporal mediation that youth perceptions of inconsistent parenting practices indirectly predict proactive and reactive aggression, and poor monitoring indirectly predicts proactive aggression via criminal thinking.

Although there was less support for criminal thinking moderating the relationships between independent variables and conduct problems or rule breaking, criminal thinking appears to be a viable option for intervention in cases of reactive, and possibly proactive aggression. Thus, based on this study, it is recommended that criminal thinking be the target of interventions with youth who are at risk for behavior problems and may also be involved with antisocial peers, or have problematic parenting styles in the home. The targeting of a single variable may allow therapists to focus their energies, reduce the reliance on third parties, and will hopefully reduce negative outcomes for the youth and society alike.

References

Achenbach, T. M., & Rescorla, L. (2001). *Manual for the ASEBA school-age forms & profiles: An integrated system of multi-informant assessment*. Burlington, VT: ASEBA.

Agnew, R. (1985). A revised strain theory of delinquency. *Social Forces, 64,* 151-167

Aizer, A., & Doyle Jr, J. J. (2015). Juvenile incarceration, human capital, and future crime: Evidence from randomly assigned judges. *The Quarterly Journal of Economics*, *130*(2), 759-803.

Andershed, H., Kerr, M., Stattin, H., & Levander, S. (2002). *Psychopathic traits in non-referred youths: A new assessment tool.* In E. Blaauw & L. Sheridan (Eds.), Psychopaths: Current international perspectives (pp. 131–158). The Hague, The Netherlands: Elsevier.

Andershed, H., Hodgins, S., & Tengstrom, A. (2007). Convergent validity of the Youth Psychopathic Traits Inventory association with the Psychopathy Checklist: Youth Version. *Assessment, 14*, 144–154.

Andrews, D. A., Bonta, J., & Hoge, R. D. (1990). Classification for effective rehabilitation: Rediscovering psychology. *Criminal justice and Behavior*, *17*(1), 19-52.

Andrews, D. A., Bonta, J., & Wormith, J. S. (2006). The recent past and near future of risk and/or need assessment. *Crime & Delinquency*, *52*(1), 7-27.

Andrews, D. A., Guzzo, L., Raynor, P., Rowe, R. C., Rettinger, L. J., Brews, A., & Wormith, J. S. (2012). Are the major risk/need factors predictive of both female and male reoffending? A test with the eight domains of the Level of Service/Case Management Inventory. *International journal of offender therapy and comparative criminology*, *56*(1), 113-133.

Baglivio, M. T. (2009). The assessment of risk to recidivate among a juvenile offending population. *Journal of Criminal Justice*, *37*(6), 596-607.

Bateman, A., O'Connell, J., Lorenzini, N., Gardner, T., & Fonagy, P. (2016). A randomised controlled trial of mentalization-based treatment versus structured clinical management for patients with comorbid borderline personality disorder and antisocial personality disorder. *BMC psychiatry*, *16*(1), 304-315.

Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods, 11,* 142–163.

Beauchaine, T. P., & Thayer, J. F. (2015). Heart rate variability as a transdiagnostic biomarker of psychopathology. *International Journal of Psychophysiology*, *98*(2), 338-350.

Becan, J. E., Knight, D. K., Crawley, R. D., Joe, G. W., & Flynn, P. M. (2015). Effectiveness of the Treatment Readiness and Induction Program for increasing adolescent motivation for change. *Journal of Substance Abuse Treatment*, *50*, 38-49.

Berg, J. M., Hecht, L. K., Latzman, R. D., & Lilienfeld, S. O. (2015). Examining the correlates of the coldheartedness factor of the Psychopathic Personality Inventory–Revised. *Psychological Assessment*, *27*(4), 1494-1500.

Bijttebier, P., & Decoene, S. (2009). Assessment of psychopathic traits in children and adolescents: Further validation of the Antisocial Process Screening Device and the Childhood Psychopathy Scale. *European Journal of Psychological Assessment*, *25*(3), 157-163.

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in public health*, *6* (149), 1-18.

Boduszek, D., Belsher, R., Dhingra, K., & Ioannou, M. (2014). Psychosocial correlates of recidivism in a sample of ex-prisoners: the role of oppositional defiant disorder and conduct disorder. *The Journal of Forensic Psychiatry & Psychology*, *25*(1), 61-76.

Bonta, J., & Andrews, D. (2010). Viewing offender assessment and rehabilitation through the lens of the risk-need-responsivity model. *Offender Supervision: New Directions in Theory, Research and Practice*, 19-40.

Bonta, J., & Andrews, D. A. (2007). Risk-need-responsivity model for offender assessment and rehabilitation. *Rehabilitation*, *6*(1), 1-22.

Bonta, J., & Andrews, D. A. (2016). *The Psychology of Criminal Conduct*. Taylor & Francis.

Campbell, C., Onifade, E., Barnes, A., Peterson, J., Anderson, V., Davidson, W., & Gordon, D. (2014). Screening offenders: The exploration of a youth level of service/case management inventory (YLS/CMI) brief screener. *Journal of Offender Rehabilitation, 53*(1), 19-34.

Carr, W. A., Rosenfeld, B., Magyar, M., & Rotter, M. (2009). An exploration of criminal thinking styles among civil psychiatric patients. *Criminal Behaviour and Mental Health*, *19*(5), 334-346.

Chadwick, N., Dewolf, A., & Serin, R. (2015). Effectively training community supervision officers: A meta-analytic review of the impact on offender outcome. *Criminal Justice and Behavior*, *42*(10), 977-989.

Choe, D. E., Olson, S. L., & Sameroff, A. J. (2013). The interplay of externalizing problems and physical and inductive discipline during childhood. *Developmental Psychology*, *49*(11), 2029.

Cicchetti, D.V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*(4), 284–290.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences (2nd ed).* Mahwah, New Jersey: Lawrence Erlbaum.

Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of general psychiatry*, *60*(8), 837-844.

Council of Economic Advisors. (2016). *THE ANNUAL REPORT of the COUNCIL OF ECONOMIC ADVISERS*

Crawley, R. D., Becan, J. E., Knight, D. K., Joe, G. W., & Flynn, P. M. (2015). Predictors of Physical Altercation among Adolescents in Residential Substance Abuse Treatment. *Deviant behavior*, *36*(12), 996-1018.

Delk, L. A., Spangler, D. P., Guerra, R., Ly, V. & White, B. A., (In Press). Antisocial Behavior: The Impact of Psychopathic Traits, Heart Rate Variability, and Gender. *Psychopathology and Behavioral Assessment.*

Dembo, R., Turner, C. W., & Jainchill, N. (2007). An assessment of criminal thinking among incarcerated youths in three states. *Criminal Justice and Behavior*, *34*(9), 1157-1167.

Dodge, K. A., Bierman, K. L., Coie, J. D.,... & Conduct Problems Prevention Research Group. (2015). Impact of early intervention on psychopathology, crime, and well-being at age 25. *American journal of psychiatry*, *172*(1), 59-70.

Douglas, K. S., & Skeem, J. L. (2005). Violence risk assessment: getting specific about being dynamic. *Psychology, Public Policy, and Law*, *11*(3), 347-383.

Egan, V., McMurran, M., Richardson, C., & Blair, M. (2000). Criminal cognitions and personality: What does the PICTS really measure?. *Criminal Behaviour and Mental Health*, *10*(3), 170-184.

Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., ... & Guthrie, I. K. (2001). The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Development*, *72*(4), 1112-1134.

Euler, F., Steinlin, C., & Stadler, C. (2017). Distinct profiles of reactive and proactive aggression in adolescents: associations with cognitive and affective empathy. *Child and Adolescent Psychiatry and Mental Health*, *11*(1), 1-14.

Fix, R. L., & Fix, S. T. (2015). Trait psychopathy, emotional intelligence, and criminal thinking: Predicting illegal behavior among college students. *International Journal of Law and Psychiatry*, *42*, 183-188.

Frick, P. J. (1991). The Alabama Parenting Questionnaire. Unpublished rating scale, University of Alabama

García-Gomis, A., Villanueva, L., & Jara, P. (2017). Risk Factors and Youth Recidivism Prediction in General and Property Offenders. *Psychiatry, Psychology and Law*, *24*(2), 308-318.

Gendreau, P., Little, T., & Goggin, C. (1996). A meta-analysis of the predictors of adult offender recidivism: What works!. *Criminology*, *34*(4), 575-608.

Giordano, P. C., Cernkovich, S. A., & Holland, D. D. (2003). Changes in friendship relations over the life course: Implications for desistance from crime. *Criminology*, *41*(2), 293-328.

Gonzalez, R., Mandracchia, J. T., Nicholson, B., & Dahlen, E. (2014). Exploring parenting as a predictor of criminogenic thinking in college students. *International Journal of Offender Therapy and Comparative Criminology*, *58*(9), 1081-1100.

Hann, D. M. (2001). Taking stock of risk factors for child/youth externalizing behavior problems. *National Institute of Mental Health.* No-02-4938

Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., ... & Duda, S. N. (2019). The REDCap consortium: Building an international community of software platform partners. *Journal of Biomedical Informatics*, *95*, 103208.

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, *42*(2), 377-81.

Hayes, A. F. (2013). *An Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York: The Guilford Press.

Hayes, A. F., & Rockwood, N. J. (2020). Conditional process analysis: Concepts, computation, and advances in the modeling of the contingencies of mechanisms. *American Behavioral Scientist*, *64*(1), 19-54.

Hecht, L. K., Latzman, R. D., Lilienfeld, S. O., David, D., Jay Lynn, S., & H Montgomery, G. (2018). The Psychological Treatment of Psychopathy. *Evidence-Based Psychotherapy: The State of the Science and Practice*, 271-298.

Hemphill, J. (2003). Interpreting the Magnitudes of Correlation Coefficients. *American Psychologist, 58*(1), 78–80.

Henrichson, C., & Delaney, R. (2012). The price of prisons: What incarceration costs taxpayers. *Federal Sentencing Reporter*, *25*, 68-82.

Hoge, R. D., & Andrews, D. A. (2002). The youth level of service/case management inventory manual and scoring key. *Toronto, Canada: Multi-Health Systems*.

Hunsley, J., & Meyer, G. J. (2003). The incremental validity of psychological testing and assessment: conceptual, methodological, and statistical issues. *Psychological Assessment*, *15*(4), 446-455.

Jones, N. J., Brown, S. L., Robinson, D., & Frey, D. (2016). Validity of the youth assessment and screening instrument: A juvenile justice tool incorporating risks, needs, and strengths. *Law and Human Behavior*, *40*(2), 182-194.

Kerns, K. A., Aspelmeier, J. E., Gentzler, A. L., & Grabill, C. M. (2001). Parent–child attachment and monitoring in middle childhood. *Journal of Family Psychology*, *15*(1), 69-81.

Knight, D. K., Becan, J. E., Landrum, B., Joe, G. W., & Flynn, P. M. (2014). Screening and assessment tools for measuring adolescent client needs and functioning in substance abuse treatment. *Substance Use & Misuse*, *49*(7), 902-918.

Knight, K., Garner, B. R., Simpson, D. D., Morey, J. T., & Flynn, P. M. (2006). An assessment for criminal thinking. *Crime & Delinquency*, *52*(1), 159-177.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155-163.

Kornienko, O., Davila, M., & Santos, C. E. (2019). Friendship network dynamics of aggressive and rule-breaking antisocial behaviors in adolescence. *Journal of Youth and Adolescence*, *48*(10), 2065-2078.

Krabbe, P. (2016). *The measurement of health and health status: concepts, methods and applications from a multidisciplinary perspective*. London, UK: Academic Press.

Kreft, I. G., Kreft, I., & De Leeuw, J. (1998). *Introducing Multilevel Modeling*. Sage.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606-613.

Kroner, D. G., & Morgan, R. D. (2014). An overview of strategies for the assessment and treatment of criminal thinking. *Forensic CBT: A Handbook for Clinical Practice*, 85-103.

Laird, R. D., Criss, M. M., Pettit, G. S., Dodge, K. A., & Bates, J. E. (2008). Parents' monitoring knowledge attenuates the link between antisocial friends and adolescent delinquent behavior. *Journal of Abnormal Child Psychology*, *36*(3), 299-310.

Laird, R. D., Pettit, G. S., Bates, J. E., & Dodge, K. A. (2003). Parents' monitoring-relevant knowledge and adolescents' delinquent behavior: evidence of correlated developmental changes and reciprocal influences. *Child Development*, *74*(3), 752-768.

Lambie, I., & Randell, I. (2013). The impact of incarceration on juvenile offenders. *Clinical Psychology Review*, *33*(3), 448-459.

Leppink, J., & Pérez-Fuster, P. (2017). We need more replication research–A case for test-retest reliability. *Perspectives on Medical Education*, *6*(3), 158-164.

Lipsey, MW. (2009). The primary factors that characterize effective interventions with juvenile offenders: a meta-analytic overview. *Victims and offenders, 4*(2), 124–147.l

Lovins, B., Lowenkamp, C. T., & Latessa, E. J. (2009). Applying the risk principle to sex offenders: Can treatment make some sex offenders worse?. *The Prison Journal*, *89*(3), 344-357.

Lovins, B., L., Lowenkamp, C. T., Latessa, E. J., & Smith, P. (2007). Application of the risk principle to female offenders. *Journal of Contemporary Criminal Justice*, *23*(4), 383-398.

Lynam, D. R. (1997). Pursuing the psychopath: Capturing the fledgling psychopath in a nomological net. *Journal of Abnormal Psychology*, *106*(3), 425-438.

Lynam, D. R., Caspi, A., Moffitt, T. E., Raine, A., Loeber, R., & Stouthamer-Loeber, M. (2005). Adolescent psychopathy and the Big Five: Results from two samples. *Journal of Abnormal Child Psychology*, *33*(4), 431-443.

Maas, C. J., & Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, *1*(3), 86-92.

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis.* Mahwah, NJ: Erlbaum.

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*(1), 99-128.

Manchak, S. M., & Cullen, F. T. (2015). 30 Intervening Effectively with Juvenile Offenders: Answers from Meta-Analysis. In *The Development of Criminal and Antisocial Behavior* (pp. 477-490). Springer, Cham.

Mandracchia, J. T., & Morgan, R. D. (2011). Understanding criminals' thinking: Further examination of the measure of offender thinking styles–revised. *Assessment*, *18*(4), 442-452.

Mandracchia, J. T., Morgan, R. D., Garos, S., & Garland, J. T. (2007). Inmate thinking patterns: An empirical investigation. *Criminal Justice and Behavior*, *34*(8), 1029-1043.

Marcus, R. F., & Kramer, C. (2001). Reactive and proactive aggression: Attachment and social competence predictors. *The Journal of Genetic Psychology*, *162*(3), 260-275.

Masi, G., Milone, A., Brovedani, P., Pisano, S., & Muratori, P. (2016). Psychiatric evaluation of youths with disruptive behavior disorders and psychopathic traits: a critical review of assessment measures. *Neuroscience & Biobehavioral Reviews*, *91*, 21-33.

McCoy, K., Fremouw, W., Tyner, E., Clegg, C., Johansson-Love, J., & Strunk, J. (2006). Criminal-thinking styles and illegal behavior among college students: Validation of the PICTS. *Journal of Forensic Sciences*, *51*(5), 1174-1177.

McGuire, J. (2004). *Understanding Psychology and Crime: Perspectives on Theory and Action*. McGraw-Hill Education (UK).

Meijer, R. R., & Baneke, J. J. (2004). Analyzing psychopathology items: A case for nonparametric item response theory modeling. *Psychological Methods, 9*, 354 –368.

Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S.,... & Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents: results from the National Comorbidity Survey Replication–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*(10), 980-989.

Meyer, J. P. (2014). *Applied measurement with jMetrik*. Routledge.

Mills, J. F., Kroner, D. G., & Forth, A. E. (2002). Measures of Criminal Attitudes and Associates (MCAA) development, factor structure, reliability, and validity. *Assessment*, *9*(3), 240-253.

Mills, J. F., Kroner, D. G., & Hemmati, T. (2004). The measures of criminal attitudes and associates (MCAA) the prediction of general and violent recidivism. *Criminal Justice and Behavior*, *31*(6), 717-733.

Mitchell, S. M., Bartholomew, N. R., Morgan, R. D., & Cukrowicz, K. C. (2017). A Preliminary Investigation of the Psychological Inventory of Criminal Thinking Styles–Layperson Edition–Short Form. *Criminal Justice and Behavior*, *44*(5), 756-769.

Mitchell, D., & Tafrate, R. C. (2012). Conceptualization and measurement of criminal thinking: Initial validation of the Criminogenic Thinking Profile. *International Journal of Offender Therapy and Comparative Criminology*, *56*(7), 1080-1102.

Morgado, F. F., Meireles, J. F., Neves, C. M., Amaral, A. C., & Ferreira, M. E. (2018). Scale development: ten main limitations and recommendations to improve future research practices. *Psicologia: Reflexão e Crítica*, *30*(3), 2-20.

Neumann, C. S., & Pardini, D. (2014). Factor structure and construct validity of the Self-Report Psychopathy (SRP) Scale and the Youth Psychopathic Traits Inventory (YPI) in young men. *Journal of Personality Disorders*, *28*(3), 419-433.

O'Hagan, H. R., Brown, S. L., Jones, N. J., & Skilling, T. A. (2019). The reliability and validity of the measure of criminal attitudes and associates and the pride in delinquency scale in a mixed sex sample of justice-involved youth. *Criminal Justice and Behavior*, *46*(5), 751-769.

Olino, T. M., Yu, L., Klein, D. N., Rohde, P., Seeley, J. R., Pilkonis, P. A., & Lewinsohn, P. M. (2012). Measuring depression using item response theory: an examination of three measures of depressive symptomatology. *International Journal of Methods in Psychiatric Research*, *21*(1), 76-85.

Olver, M. E., Stockdale, K. C., & Wormith, J. S. (2009). Risk assessment with young offenders: A meta-analysis of three assessment measures. *Criminal Justice and Behavior*, *36*(4), 329-353.

Palmer, E. J., & Hollin, C. R. (2004). The use of the Psychological Inventory of Criminal Thinking Styles with English young offenders. *Legal and Criminological Psychology*, *9*(2), 253-263.

Pardini, D. A., & Fite, P. J. (2010). Symptoms of conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and callous-unemotional traits as unique predictors of psychosocial maladjustment in boys: Advancing an evidence base for DSM-V. *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*(11), 1134-1144.

Patrick, C. J. (2010). Conceptualizing the psychopathic personality: Disinhibited, bold,…Or just plain mean? In R. T. Salekin & D. R. Lynam (Eds.), *Handbook of Child and Adolescent Psychopathy* (p. 15–48). The Guilford Press.

Peterson-Badali, M., Skilling, T., & Haqanee, Z. (2015). Examining implementation of risk assessment in case management for youth in the justice system. *Criminal Justice and Behavior*, *42*(3), 304-320.

Pettus-Davis, C., Brown, D., Veeh, C., & Renn, T. (2016). The economic burden of incarceration in the US. *Institute for Advancing Justice Research and Innovation. Washington University in St. Louis*.

Pinquart, M. (2017). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology*, *53*(5), 873-932.

Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures, 6,* 77–98.

Puzzanchera, C., Hockenberry, S., Sladky, T.J., & Kang, W. (2018). "Juvenile Residential Facility Census Databook." Available: https://www.ojjdp.gov/ojstatbb/jrfcdb/

Ragatz, L. L., Anderson, R. J., Fremouw, W., & Schwartz, R. (2011). Criminal thinking patterns, aggression styles, and the psychopathic traits of late high school bullies and bully-victims. *Aggressive Behavior*, *37*(2), 145-160.

Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., ... & Liu, J. (2006). The reactive–proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior: Official Journal of the International Society for Research on Aggression*, *32*(2), 159-171.

Rode, M. (2014). Criminal thinking styles of minors. Social and personality correlates. *Current Issues in Personality Psychology*, *2*(4), 237-250.

Rousson, V., Gasser, T., & Seifert, B. (2002). Assessing intrarater, interrater and test–retest reliability of continuous measurements. *Statistics in Medicine*, *21*(22), 3431-3446.

Sawyer, A. M., Borduin, C. M., & Dopp, A. R. (2015). Long-term effects of prevention and treatment on youth antisocial behavior: A meta-analysis. *Clinical Psychology Review*, *42*, 130-144.

Schwalbe, C. S. (2007). Risk assessment for juvenile justice: A meta-analysis. *Law and Human Behavior*, *31*(5), 449-462.

Serin, R. C., & Lloyd, C. D. (2009). Examining the process of offender change: The transition to crime desistance. *Psychology, Crime & Law*, *15*(4), 347-364.

Shaw, C. R., & McKay, H. D. (1942). Juvenile delinquency and urban areas. *Chicago: University of Chicago Press.*

Simourd, D. J., Hoge, R. D., Andrews, D. A., & Leschied, A. W. (1994). An empirically-based typology of male young offenders. *Canadian Journal of Criminology, 36*, 447-46.

Simpson, D. D., Joe, G. W., Knight, K., Rowan-Szal, G. A., & Gray, J. S. (2012). Texas Christian University (TCU) short forms for assessing client needs and functioning in addiction treatment. *Journal of Offender Rehabilitation*, *51*(1-2), 34-56.

Stevens, M. (2018). Preventing at-risk children from developing antisocial and criminal behaviour: a longitudinal study examining the role of parenting, community and societal factors in middle childhood. *BMC psychology*, *6*(1), 40-52.

Stormshak, E. A., Bierman, K. L., McMahon, R. J., & Lengua, L. J. (2000). Parenting practices and child disruptive behavior problems in early elementary school. *Journal of Clinical Child Psychology*, *29*(1), 17-29.

Swisher, R. R., & Dennison, C. R. (2016). Educational pathways and change in crime between adolescence and early adulthood. *Journal of Research in Crime and Delinquency*, *53*(6), 840-871.

Taxman, F. S., Giuranna Rhodes, A., & Dumenci, L. (2011). Construct and predictive validity of criminal thinking scales. *Criminal Justice and Behavior*, *38*(2), 174-187.

Taylor, T. K., Burns, G. L., Rusby, J. C., & Foster, E. M. (2006). Oppositional defiant disorder toward adults and oppositional defiant disorder toward peers: Initial evidence for two separate constructs. *Psychological Assessment*, *18*(4), 439-443.

Vaske, J. C., Gehring, K. S., & Lovins, B. (2017). Gender differences in the measurement of criminal thinking. *Criminal Justice and Behavior*, *44*(3), 395-415.

Walters, G. D. (1995). The psychological inventory of criminal thinking styles: Part I: Reliability and preliminary validity. *Criminal Justice and Behavior*, *22*(3), 307-325.

Walters, G. D. (2009). Criminal thinking. *Personality, Personality Disorder and Violence*, 281-298.

Walters, G. D. (2012). Substance abuse and criminal thinking: Testing the countervailing, mediation, and specificity hypotheses. *Law and Human Behavior, 36*(6), 506-512.

Walters, G. D. (2014). An item response theory analysis of the Psychological Inventory of Criminal Thinking Styles: Comparing male and female probationers and prisoners. *Psychological Assessment*, *26*(3), 1050-1055.

Walters, G. D. (2015). Proactive criminal thinking and the transmission of differential association: A cross-lagged multi-wave path analysis. *Criminal Justice and Behavior*, *42*(11), 1128-1144.

Walters, G. D. (2016a). Friends, cognition, and delinquency: Proactive and reactive criminal thinking as mediators of the peer influence and peer selection effects among male delinquents. *Justice Quarterly*, *33*(6), 1055-1079.

Walters, G. D. (2016b). Proactive criminal thinking, cold heartedness, and counselor rapport in correctional clients participating in substance abuse treatment. *Personality and Individual Differences*, *98*, 239-243.

Walters, G. D. (2016c). Someone to look up to: Effect of role models on delinquent peer selection and influence. *Youth Violence and Juvenile Justice*, *14*(3), 257-271.

Walters, G. D. (2016d). The Parent–Peer Interface: Does Inductive Parenting Reduce the Criminogenic Effect of Delinquent Peers?. *Youth Violence and Juvenile Justice*, *14*(4), 411-425.

Walters, G. D. (2017). Effect of a brief cognitive behavioural intervention on criminal thinking and prison misconduct in male inmates: Variable-oriented and person-oriented analyses. *Criminal Behaviour and Mental Health*, *27*(5), 457-469.

Walters, G. D. (2018). Proactive and reactive criminal thinking and self-reported offending: a cross-national survey of seventh-through ninth-grade boys and girls. *International Journal of Offender Therapy and Comparative Criminology*, *62*(1), 89-107

Walters, G. D. (2019a). Gang influence: Mediating the gang–delinquency relationship with proactive criminal thinking. *Criminal Justice and Behavior*, *46*(7), 1044-1062.

Walters, G. D. (2019b). Early attachment and narcissistic entitlement: tracing the roots of adolescent proactive criminal thinking. *Journal of Developmental and Life-Course Criminology*, *5*(2), 266-285.

Walters, G. D., & Cohen, T. H. (2016). Criminal thought process as a dynamic risk factor: Variable-and person-oriented approaches to recidivism prediction. *Law and Human Behavior*, *40*(4), 411-419.

Walters, G. D., & DeLisi, M. (2013). Antisocial cognition and crime continuity: Cognitive mediation of the past crime-future crime relationship. *Journal of Criminal Justice*, *41*(2), 135-140.

Walters, G. D., & Geyer, M. D. (2005). Construct validity of the Psychological Inventory of Criminal Thinking Styles in relationship to the PAI, disciplinary adjustment, and program completion. *Journal of Personality Assessment*, *84*(3), 252-260.

Walters, G. D., & Lowenkamp, C. T. (2016). Predicting recidivism with the Psychological Inventory of Criminal Thinking Styles (PICTS) in community-supervised male and female federal offenders. *Psychological Assessment*, *28*(6), 652-659.

Walters, G. D., & Mandell, W. (2007). Incremental validity of the psychological inventory of criminal thinking styles and psychopathy checklist: Screening version in predicting disciplinary outcome. *Law and Human Behavior*, *31*(2), 141-157.

Walters, G. D., & Yurvati, E. (2017). Testing the construct validity of the PICTS proactive and reactive scores against six putative measures of proactive and reactive criminal thinking. *Psychology, Crime & Law*, *23*(1), 1-14.

Warner, C., Conley, T., & Murphy, R. (2018). Criminal thinking shifts among male prisoners participating in a cognitive-based education programme. *Criminal Behaviour and Mental Health*, *28*(2), 152-157.

Whited, W. H., Wagar, L., Mandracchia, J. T., & Morgan, R. D. (2017). Partners or partners in crime? The relationship between criminal associates and criminogenic thinking. *International Journal of Offender Therapy and Comparative Criminology*, *61*(5), 491-507.

Wong, S. C., Stockdale, K. C., & Olver, M. E. (2017). Violence Reduction Treatment of Psychopathy. *The Wiley Handbook of Violence and Aggression*.

Zlomke, K. R., Lamport, D., Bauman, S., Garland, B., & Talbot, B. (2014). Parenting adolescents: Examining the factor structure of the Alabama Parenting Questionnaire for adolescents. *Journal of Child and Family Studies*, *23*(8), 1484-1490.

TABLES

Table 1. Data Collected

Collected from:	Data/measure
Youth – at first assessment	• Texas Christian University Criminal Thinking Styles Form • Youth Psychopathic Traits Inventory • Alabama Parenting Questionnaire Child Form • Reactive-proactive aggression questionnaire • Patient Health Questionnaire 9A • Measures of Criminal Attitudes and Associates
Parent/Guardian – Initial assessment	• Brief YLS/CMI (risk level) • history of abuse • mental illness • prior drug use • Child Behavior Checklist
Youth – every 4 weeks, 4 times total	• Texas Christian University Criminal Thinking Styles Form • Youth Psychopathic Traits Inventory • Alabama Parenting Questionnaire Child Form • Reactive-proactive aggression questionnaire
Parent/Guardian – Final Follow up at 4th assessment	• new arrests or convictions, CPS contact, or drug use • Child Behavior Checklist • Alabama Parenting Questionnaire Parent Form • Child Psychopathy Scale

Table 2. Sample Descriptive Statistics with Attrition

Set	1		2		3		4	
N	64		59		55		54	
Age: M (SD)	15.99 (1.32)		15.99 (1.28)		16 (1.3)		16.02 (1.32)	
Grade: M (SD)	10.11 (1.3)		10.14 (1.28)		10.18 (1.28)		10.19 (1.29)	
YLS: M (SD)	2.92 (2)		2.97 (2.03)		2.93 (2)		2.87 (1.97)	
% Male	51.6		52.5		50.9		50	
% White	90.6		89.8		89.1		88.9	
	male	female	male	female	male	female	male	female
n YLS low (scores 0-2)	12	14	11	13	11	12	11	12
n YLS moderate to high (scores 3-10)	21	17	20	15	17	15	16	15

Note: Age was computed as total months divided by 12; YLS = Youth Level of Service

Table 3. Sample Mean and Standard Deviation of Criminal Thinking and Aggression Scores

	Dembo et al., 2007[1,2]		Knight et al., 2006		Present Sample		
CTS	M	SD	M	SD	M	SD	range
EN	25.1	8.2	19.74	5.91	11.44	2.71	6-18
JU	25.0	7.9	21.3	6.74	12.75	3.54	6-23
PO	30.5	8.1	25.76	7.62	19.27	4.87	7-31
PI	25.5	7.2	21.88	6.73	13.30	3.31	6-21
CN	30.1	8.4	32.32	7.91	17.23	4.15	6-28
CH			22.93	6.69	9.30	2.91	5-18
MCAA	O'Hagan et al., 2019[1] Males		O'Hagan et al., 2019[1] Females		Present Sample		
Total	25.57	8.95	25.18	8.64	12.22	6.83	0-32
Violence	6.28	3.11	5.77	3.13	3.16	2.62	0-10
Entitlement	6.77	2.50	6.39	2.44	4.11	2.43	0-10
Intent	5.86	3.33	5.96	3.24	2.81	2.64	0-11
Associates	6.66	2.65	7.07	2.39	2.14	2.11	0-9
Criminal peers	1.84	1.42	2.28	1.25	1.39	5.68	0-32
RPQ	Raine et al., 2006 Males		Euler et al., 2017[1]		Present Sample		
RA	7.14	4.18	11.79	5.20	6.86	4.11	0-22
PA	2.79	3.47	5.92	5.10	1.19	2.31	0-14

[1]Sample was with justice-involved youth

[2]Study did not include descriptive statistics for the cold-heartedness scale

Note: CTS = Criminal Thinking Styles; EN = Entitlement; JU = Justification; PO = Power orientation, CH = Cold heartedness, CN = Criminal rationalization; PI = Personal irresponsibility; MCAA = Measures of Criminal Attitudes and Associates; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression

Table 4a. Criminal Thinking Styles Item Analysis, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
1	1.88	0.16	0.8232	1.85	-0.03	0.871
2	2.55	0.39	0.8163	2.80	0.49	0.8608
3	1.48	0.37	0.8191	1.66	0.52	0.862
4	2.53	0.39	0.817	2.69	0.32	0.8647
5	2.94	0.35	0.8176	2.86	0.19	0.8679
6	2.03	0.21	0.822	2.02	0.16	0.8681
7	2.75	0.35	0.8178	2.71	0.45	0.8621
8	3.19	0.45	0.8144	3.05	0.33	0.8642
9	2.02	0.21	0.8216	1.95	0.63	0.8584
10	2.44	0.35	0.818	2.37	0.17	0.8672
11	2.00	0.38	0.8173	2.08	0.29	0.8646
12	2.34	-0.14	0.8346	2.42	0.01	0.8714
13	3.42	0.38	0.8169	3.58	0.15	0.8689
14	2.38	0.42	0.8158	2.08	0.58	0.8592
15	3.42	0.08	0.8259	3.58	-0.21	0.874
16	2.02	0.57	0.8128	2.00	0.49	0.8616
17	1.47	0.02	0.825	1.69	0.19	0.8666
18	2.78	0.43	0.8149	2.92	0.35	0.8641
19	2.39	0.34	0.818	2.44	0.54	0.8602
20	2.53	0.50	0.8126	2.53	0.72	0.8562
21	2.77	0.27	0.8203	2.56	0.49	0.8606
22	1.48	0.51	0.818	1.66	0.48	0.863
23	2.00	0.58	0.8114	2.19	0.51	0.8601
24	2.03	0.34	0.8183	2.08	0.62	0.8583
25	1.86	0.62	0.8117	1.98	0.80	0.8547
26	2.16	0.34	0.8181	2.42	0.28	0.8656
27	1.53	0.04	0.8248	1.59	0.21	0.8667
28	2.55	0.34	0.8182	2.46	0.26	0.8659
29	2.59	0.24	0.8213	2.49	0.44	0.8622
30	2.94	0.15	0.8241	2.83	0.26	0.8658
31	1.94	0.38	0.817	2.15	0.61	0.8585
32	2.27	0.40	0.8168	2.39	0.63	0.8578
33	1.59	0.51	0.8169	1.78	0.72	0.8576
34	2.95	0.25	0.8209	2.76	0.44	0.862
35	1.97	0.65	0.8103	2.02	0.68	0.8579
36	1.92	0.60	0.8112	2.08	0.70	0.8564

Table 4b. Criminal Thinking Styles Item Analysis, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
1	1.88	0.26	0.8696	1.98	0.12	0.8901
2	2.55	0.52	0.8643	2.37	0.60	0.8823
3	1.66	0.53	0.8658	1.57	0.60	0.8842
4	2.61	0.31	0.8685	2.67	0.39	0.8861
5	2.95	0.43	0.8663	3.02	0.46	0.8848
6	2.13	0.04	0.8738	2.02	0.03	0.8919
7	2.70	0.40	0.8668	2.37	0.57	0.8828
8	2.96	0.37	0.8674	2.93	0.30	0.8877
9	2.00	0.49	0.8657	1.76	0.86	0.8809
10	2.39	0.35	0.8682	2.24	0.34	0.8869
11	1.95	0.69	0.8631	2.04	0.69	0.8817
12	2.41	-0.17	0.8788	2.48	-0.07	0.8943
13	3.30	0.03	0.8744	3.41	0.14	0.89
14	2.11	0.58	0.8633	1.83	0.65	0.8828
15	3.54	-0.12	0.8775	3.63	-0.07	0.8935
16	2.04	0.47	0.866	2.11	0.65	0.8816
17	1.75	0.18	0.8707	1.56	0.26	0.8878
18	2.59	0.33	0.8683	2.72	0.39	0.8862
19	2.70	0.42	0.8663	2.57	0.40	0.8858
20	2.46	0.49	0.865	2.24	0.64	0.8824
21	2.64	0.21	0.8715	2.59	0.45	0.8849
22	1.68	0.63	0.8646	1.70	0.51	0.8853
23	2.21	0.69	0.8602	2.35	0.77	0.8794
24	2.05	0.50	0.8653	2.04	0.38	0.8863
25	2.13	0.80	0.859	2.00	0.72	0.8815
26	2.30	0.58	0.8636	2.11	0.55	0.8836
27	1.71	0.24	0.8697	1.74	0.16	0.8893
28	2.46	0.41	0.8666	2.33	0.33	0.8873
29	2.54	0.53	0.8644	2.30	0.49	0.8844
30	2.79	0.17	0.872	2.67	0.36	0.8864
31	2.21	0.65	0.8624	2.20	0.48	0.8847
32	2.39	0.64	0.8622	2.41	0.56	0.8832
33	1.91	0.71	0.8628	1.80	0.67	0.8823
34	2.91	0.18	0.8712	2.85	0.38	0.8861
35	2.09	0.69	0.8611	1.93	0.80	0.8792
36	2.14	0.68	0.8615	2.07	0.70	0.8811

Table 5a. Criminal Thinking Styles Item Analysis without Item 12, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
1	1.88	0.14	0.8358	1.85	-0.08	0.8767
2	2.55	0.38	0.8293	2.80	0.50	0.8661
3	1.48	0.38	0.8314	1.66	0.53	0.8673
4	2.53	0.40	0.8293	2.69	0.34	0.8697
5	2.94	0.35	0.8304	2.86	0.19	0.8734
6	2.03	0.18	0.8353	2.02	0.12	0.8738
7	2.75	0.36	0.8301	2.71	0.45	0.8672
8	3.19	0.47	0.8267	3.05	0.35	0.8693
9	2.02	0.22	0.8337	1.95	0.65	0.8637
10	2.44	0.36	0.8304	2.37	0.20	0.8721
11	2.00	0.41	0.8292	2.08	0.34	0.8695
13	3.42	0.39	0.8296	3.58	0.15	0.8738
14	2.38	0.40	0.8292	2.08	0.58	0.8648
15	3.42	0.08	0.838	3.58	-0.19	0.8789
16	2.02	0.56	0.8258	2.00	0.48	0.8672
17	1.47	0.02	0.837	1.69	0.15	0.8722
18	2.78	0.43	0.8281	2.92	0.35	0.8696
19	2.39	0.35	0.8304	2.44	0.54	0.8654
20	2.53	0.51	0.8256	2.53	0.73	0.8615
21	2.77	0.27	0.8329	2.56	0.49	0.8661
22	1.48	0.51	0.8305	1.66	0.49	0.8681
23	2.00	0.59	0.8242	2.19	0.52	0.8658
24	2.03	0.34	0.8308	2.08	0.64	0.8636
25	1.86	0.64	0.8242	1.98	0.81	0.8603
26	2.16	0.37	0.8299	2.42	0.29	0.8706
27	1.53	0.01	0.8374	1.59	0.17	0.8722
28	2.55	0.33	0.8311	2.46	0.26	0.8711
29	2.59	0.25	0.8333	2.49	0.44	0.8673
30	2.94	0.15	0.8365	2.83	0.26	0.8713
31	1.94	0.39	0.8297	2.15	0.63	0.864
32	2.27	0.41	0.8292	2.39	0.64	0.8631
33	1.59	0.50	0.8295	1.78	0.72	0.8631
34	2.95	0.26	0.833	2.76	0.45	0.8672
35	1.97	0.65	0.8234	2.02	0.67	0.8632
36	1.92	0.59	0.8247	2.08	0.72	0.8616

Table 5b. Criminal Thinking Styles Item Analysis without Item 12, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
1	1.88	0.22	0.879	1.98	0.10	0.8967
2	2.55	0.52	0.8734	2.37	0.61	0.8886
3	1.66	0.52	0.875	1.57	0.60	0.8906
4	2.61	0.32	0.8774	2.67	0.40	0.8924
5	2.95	0.42	0.8755	3.02	0.46	0.8914
6	2.13	0.01	0.8828	2.02	0.00	0.8986
7	2.70	0.41	0.8756	2.37	0.60	0.889
8	2.96	0.39	0.876	2.93	0.31	0.8939
9	2.00	0.50	0.8746	1.76	0.85	0.8876
10	2.39	0.36	0.877	2.24	0.34	0.8934
11	1.95	0.69	0.8721	2.04	0.70	0.8881
13	3.30	0.06	0.8825	3.41	0.16	0.8959
14	2.11	0.57	0.8726	1.83	0.63	0.8895
15	3.54	-0.11	0.8857	3.63	-0.07	0.8996
16	2.04	0.46	0.8751	2.11	0.65	0.8883
17	1.75	0.15	0.8799	1.56	0.23	0.8944
18	2.59	0.33	0.8774	2.72	0.40	0.8926
19	2.70	0.44	0.8751	2.57	0.41	0.8921
20	2.46	0.49	0.8742	2.24	0.62	0.8893
21	2.64	0.22	0.8801	2.59	0.47	0.8911
22	1.68	0.63	0.8737	1.70	0.49	0.8918
23	2.21	0.69	0.8696	2.35	0.77	0.8861
24	2.05	0.51	0.8743	2.04	0.39	0.8926
25	2.13	0.80	0.8684	2.00	0.74	0.8879
26	2.30	0.60	0.8725	2.11	0.55	0.89
27	1.71	0.21	0.8789	1.74	0.14	0.8959
28	2.46	0.40	0.8759	2.33	0.31	0.8941
29	2.54	0.54	0.8733	2.30	0.51	0.8906
30	2.79	0.17	0.8808	2.67	0.36	0.8929
31	2.21	0.65	0.8716	2.20	0.47	0.8913
32	2.39	0.65	0.8712	2.41	0.57	0.8895
33	1.91	0.70	0.8721	1.80	0.65	0.8891
34	2.91	0.20	0.8795	2.85	0.39	0.8923
35	2.09	0.70	0.8702	1.93	0.81	0.8858
36	2.14	0.69	0.8705	2.07	0.71	0.8876

Table 6a. Criminal Thinking Styles Item Analysis without Items 12, 15, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
1	1.88	0.13	0.8395	1.85	-0.07	0.884
2	2.55	0.39	0.8328	2.80	0.50	0.8739
3	1.48	0.39	0.8347	1.66	0.54	0.875
4	2.53	0.39	0.8334	2.69	0.32	0.8778
5	2.94	0.36	0.8336	2.86	0.18	0.8811
6	2.03	0.17	0.8391	2.02	0.12	0.8814
7	2.75	0.37	0.8335	2.71	0.45	0.8751
8	3.19	0.48	0.8302	3.05	0.35	0.8771
9	2.02	0.23	0.8372	1.95	0.65	0.8717
10	2.44	0.32	0.8351	2.37	0.18	0.8802
11	2.00	0.41	0.833	2.08	0.33	0.8774
13	3.42	0.37	0.834	3.58	0.14	0.8816
14	2.38	0.39	0.8332	2.08	0.58	0.8728
16	2.02	0.54	0.83	2.00	0.47	0.8751
17	1.47	0.02	0.8406	1.69	0.17	0.8795
18	2.78	0.44	0.8314	2.92	0.37	0.877
19	2.39	0.37	0.8334	2.44	0.55	0.8734
20	2.53	0.50	0.8294	2.53	0.72	0.8698
21	2.77	0.29	0.8359	2.56	0.49	0.8741
22	1.48	0.52	0.8339	1.66	0.49	0.8758
23	2.00	0.61	0.8273	2.19	0.52	0.8739
24	2.03	0.37	0.8338	2.08	0.65	0.8716
25	1.86	0.65	0.8277	1.98	0.80	0.8686
26	2.16	0.36	0.8338	2.42	0.29	0.8785
27	1.53	0.00	0.8412	1.59	0.20	0.8796
28	2.55	0.33	0.8349	2.46	0.24	0.879
29	2.59	0.25	0.8369	2.49	0.46	0.8749
30	2.94	0.16	0.84	2.83	0.26	0.879
31	1.94	0.41	0.8325	2.15	0.64	0.8719
32	2.27	0.41	0.8329	2.39	0.64	0.8712
33	1.59	0.50	0.8331	1.78	0.73	0.8711
34	2.95	0.25	0.837	2.76	0.46	0.875
35	1.97	0.65	0.827	2.02	0.67	0.8714
36	1.92	0.59	0.8282	2.08	0.71	0.8699

Table 6b. Criminal Thinking Styles Item Analysis without Items 12, 15, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
1	1.88	0.22	0.8862	1.98	0.08	0.9023
2	2.55	0.53	0.8809	2.37	0.62	0.8942
3	1.66	0.52	0.8822	1.57	0.61	0.8962
4	2.61	0.30	0.8849	2.67	0.39	0.8982
5	2.95	0.42	0.8828	3.02	0.46	0.8972
6	2.13	0.01	0.8899	2.02	-0.01	0.904
7	2.70	0.40	0.8834	2.37	0.60	0.8947
8	2.96	0.39	0.8833	2.93	0.32	0.8993
9	2.00	0.50	0.882	1.76	0.85	0.8934
10	2.39	0.34	0.8848	2.24	0.30	0.8995
11	1.95	0.69	0.8797	2.04	0.70	0.8939
13	3.30	0.04	0.8897	3.41	0.15	0.9015
14	2.11	0.57	0.8802	1.83	0.64	0.8951
16	2.04	0.45	0.8827	2.11	0.64	0.8942
17	1.75	0.16	0.8868	1.56	0.25	0.8997
18	2.59	0.35	0.8842	2.72	0.41	0.898
19	2.70	0.45	0.8822	2.57	0.43	0.8974
20	2.46	0.47	0.8819	2.24	0.61	0.8951
21	2.64	0.22	0.8873	2.59	0.48	0.8966
22	1.68	0.62	0.8811	1.70	0.48	0.8976
23	2.21	0.70	0.8771	2.35	0.77	0.8919
24	2.05	0.51	0.8816	2.04	0.39	0.8983
25	2.13	0.81	0.876	2.00	0.73	0.8937
26	2.30	0.60	0.8799	2.11	0.56	0.8956
27	1.71	0.22	0.8859	1.74	0.14	0.9013
28	2.46	0.40	0.8834	2.33	0.30	0.8997
29	2.54	0.55	0.8806	2.30	0.52	0.8961
30	2.79	0.19	0.8877	2.67	0.37	0.8984
31	2.21	0.67	0.8789	2.20	0.49	0.8966
32	2.39	0.65	0.8789	2.41	0.59	0.895
33	1.91	0.70	0.8795	1.80	0.64	0.8949
34	2.91	0.21	0.8866	2.85	0.40	0.8978
35	2.09	0.70	0.8778	1.93	0.81	0.8916
36	2.14	0.70	0.878	2.07	0.70	0.8935

Table 7a. Criminal Thinking Styles Item Analysis without Items 1, 12, 15, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.39	0.8343	2.80	0.51	0.8792
3	1.48	0.39	0.8362	1.66	0.52	0.8806
4	2.53	0.38	0.835	2.69	0.34	0.8828
5	2.94	0.35	0.8357	2.86	0.17	0.8866
6	2.03	0.15	0.8413	2.02	0.10	0.887
7	2.75	0.39	0.8344	2.71	0.44	0.8807
8	3.19	0.48	0.8317	3.05	0.36	0.8824
9	2.02	0.23	0.8388	1.95	0.65	0.8772
10	2.44	0.31	0.8371	2.37	0.20	0.885
11	2.00	0.42	0.8342	2.08	0.36	0.8823
13	3.42	0.38	0.8352	3.58	0.15	0.8866
14	2.38	0.40	0.8347	2.08	0.59	0.8781
16	2.02	0.55	0.8313	2.00	0.48	0.8803
17	1.47	0.00	0.8424	1.69	0.14	0.8851
18	2.78	0.44	0.833	2.92	0.36	0.8827
19	2.39	0.37	0.835	2.44	0.53	0.8791
20	2.53	0.51	0.8307	2.53	0.73	0.8752
21	2.77	0.28	0.8377	2.56	0.49	0.8795
22	1.48	0.51	0.8355	1.66	0.49	0.8811
23	2.00	0.61	0.8289	2.19	0.52	0.8792
24	2.03	0.38	0.8352	2.08	0.66	0.877
25	1.86	0.65	0.8292	1.98	0.80	0.8742
26	2.16	0.37	0.8354	2.42	0.28	0.884
27	1.53	-0.04	0.8434	1.59	0.17	0.8851
28	2.55	0.31	0.837	2.46	0.25	0.8842
29	2.59	0.27	0.8382	2.49	0.46	0.8804
30	2.94	0.17	0.8412	2.83	0.26	0.8842
31	1.94	0.42	0.8339	2.15	0.64	0.8773
32	2.27	0.40	0.8345	2.39	0.65	0.8766
33	1.59	0.50	0.8347	1.78	0.73	0.8765
34	2.95	0.24	0.8388	2.76	0.46	0.8804
35	1.97	0.66	0.8284	2.02	0.67	0.8768
36	1.92	0.59	0.8296	2.08	0.73	0.8752

Table 7b. Criminal Thinking Styles Item Analysis without Items 1, 12, 15, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.55	0.8809	2.37	0.63	0.897
3	1.66	0.52	0.8828	1.57	0.61	0.8989
4	2.61	0.31	0.8853	2.67	0.38	0.9011
5	2.95	0.41	0.8837	3.02	0.44	0.9003
6	2.13	-0.02	0.8909	2.02	-0.03	0.9072
7	2.70	0.41	0.8836	2.37	0.62	0.8973
8	2.96	0.39	0.884	2.93	0.34	0.9019
9	2.00	0.51	0.8823	1.76	0.85	0.8962
10	2.39	0.34	0.8853	2.24	0.29	0.9026
11	1.95	0.70	0.88	2.04	0.70	0.8967
13	3.30	0.05	0.8903	3.41	0.14	0.9046
14	2.11	0.57	0.8807	1.83	0.64	0.898
16	2.04	0.45	0.8831	2.11	0.64	0.8972
17	1.75	0.14	0.8876	1.56	0.25	0.9025
18	2.59	0.34	0.8849	2.72	0.42	0.9008
19	2.70	0.44	0.883	2.57	0.43	0.9003
20	2.46	0.48	0.8824	2.24	0.59	0.8982
21	2.64	0.23	0.8878	2.59	0.48	0.8994
22	1.68	0.62	0.8816	1.70	0.47	0.9005
23	2.21	0.70	0.8775	2.35	0.77	0.8948
24	2.05	0.51	0.8821	2.04	0.40	0.9009
25	2.13	0.81	0.8764	2.00	0.74	0.8965
26	2.30	0.61	0.8801	2.11	0.57	0.8984
27	1.71	0.19	0.8868	1.74	0.14	0.904
28	2.46	0.40	0.8839	2.33	0.30	0.9027
29	2.54	0.56	0.881	2.30	0.54	0.8987
30	2.79	0.18	0.8885	2.67	0.36	0.9012
31	2.21	0.65	0.8796	2.20	0.50	0.8994
32	2.39	0.65	0.8793	2.41	0.59	0.8979
33	1.91	0.70	0.8801	1.80	0.64	0.8978
34	2.91	0.22	0.8869	2.85	0.40	0.9007
35	2.09	0.71	0.878	1.93	0.83	0.8943
36	2.14	0.71	0.8782	2.07	0.71	0.8963

Table 8a. Criminal Thinking Styles Item Analysis without Items 1, 6, 12, 15, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.39	0.8361	2.80	0.52	0.8823
3	1.48	0.42	0.8376	1.66	0.50	0.8841
4	2.53	0.39	0.8368	2.69	0.35	0.8858
5	2.94	0.35	0.8377	2.86	0.18	0.8898
7	2.75	0.40	0.836	2.71	0.45	0.8839
8	3.19	0.50	0.8331	3.05	0.37	0.8854
9	2.02	0.23	0.8406	1.95	0.66	0.8803
10	2.44	0.29	0.8394	2.37	0.22	0.8879
11	2.00	0.44	0.8356	2.08	0.39	0.885
13	3.42	0.38	0.837	3.58	0.15	0.89
14	2.38	0.39	0.8368	2.08	0.59	0.8814
16	2.02	0.55	0.8332	2.00	0.46	0.8838
17	1.47	-0.04	0.8449	1.69	0.10	0.8887
18	2.78	0.43	0.8352	2.92	0.35	0.8863
19	2.39	0.38	0.8366	2.44	0.54	0.8822
20	2.53	0.50	0.8329	2.53	0.73	0.8785
21	2.77	0.28	0.8397	2.56	0.48	0.883
22	1.48	0.51	0.8374	1.66	0.49	0.8843
23	2.00	0.61	0.8307	2.19	0.52	0.8824
24	2.03	0.38	0.8369	2.08	0.66	0.8801
25	1.86	0.63	0.8313	1.98	0.79	0.8778
26	2.16	0.38	0.8369	2.42	0.29	0.8869
27	1.53	-0.08	0.8461	1.59	0.12	0.8887
28	2.55	0.29	0.8396	2.46	0.24	0.8874
29	2.59	0.27	0.8401	2.49	0.45	0.8837
30	2.94	0.18	0.8428	2.83	0.27	0.8872
31	1.94	0.44	0.8354	2.15	0.64	0.8805
32	2.27	0.42	0.836	2.39	0.66	0.8795
33	1.59	0.49	0.8367	1.78	0.73	0.8797
34	2.95	0.25	0.8406	2.76	0.47	0.8834
35	1.97	0.66	0.83	2.02	0.67	0.8802
36	1.92	0.60	0.8313	2.08	0.74	0.8782

Table 8b. Criminal Thinking Styles Item Analysis without Items 1, 6, 12, 15, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.55	0.8859	2.37	0.65	0.902
3	1.66	0.52	0.8877	1.57	0.62	0.9039
4	2.61	0.31	0.8901	2.67	0.38	0.9063
5	2.95	0.40	0.8888	3.02	0.43	0.9056
7	2.70	0.43	0.8884	2.37	0.64	0.9022
8	2.96	0.39	0.8889	2.93	0.36	0.9066
9	2.00	0.52	0.8872	1.76	0.84	0.9015
10	2.39	0.33	0.8903	2.24	0.27	0.9079
11	1.95	0.72	0.8848	2.04	0.71	0.9018
13	3.30	0.07	0.8948	3.41	0.14	0.9094
14	2.11	0.56	0.8859	1.83	0.64	0.9032
16	2.04	0.46	0.888	2.11	0.64	0.9024
17	1.75	0.13	0.8926	1.56	0.21	0.9078
18	2.59	0.34	0.8899	2.72	0.41	0.9061
19	2.70	0.45	0.8878	2.57	0.43	0.9053
20	2.46	0.46	0.8877	2.24	0.58	0.9035
21	2.64	0.22	0.8928	2.59	0.49	0.9045
22	1.68	0.62	0.8866	1.70	0.45	0.9057
23	2.21	0.70	0.8827	2.35	0.77	0.9002
24	2.05	0.52	0.8871	2.04	0.41	0.9059
25	2.13	0.80	0.8817	2.00	0.73	0.9018
26	2.30	0.62	0.885	2.11	0.58	0.9034
27	1.71	0.16	0.8921	1.74	0.13	0.9092
28	2.46	0.38	0.8893	2.33	0.28	0.908
29	2.54	0.56	0.886	2.30	0.55	0.9037
30	2.79	0.17	0.8936	2.67	0.37	0.9063
31	2.21	0.66	0.8846	2.20	0.50	0.9045
32	2.39	0.65	0.8844	2.41	0.59	0.9032
33	1.91	0.70	0.885	1.80	0.64	0.903
34	2.91	0.24	0.8916	2.85	0.41	0.9057
35	2.09	0.71	0.8833	1.93	0.83	0.8997
36	2.14	0.72	0.8832	2.07	0.72	0.9014

Table 9a. Criminal Thinking Styles Item Analysis without Items 1, 6, 12, 15, and 27, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.40	0.8409	2.80	0.52	0.8841
3	1.48	0.42	0.8425	1.66	0.48	0.8863
4	2.53	0.40	0.8416	2.69	0.36	0.8876
5	2.94	0.35	0.8428	2.86	0.18	0.8915
7	2.75	0.41	0.8408	2.71	0.44	0.8859
8	3.19	0.50	0.8382	3.05	0.39	0.8869
9	2.02	0.22	0.8459	1.95	0.65	0.8823
10	2.44	0.29	0.8446	2.37	0.23	0.8896
11	2.00	0.45	0.8405	2.08	0.40	0.8866
13	3.42	0.40	0.8416	3.58	0.15	0.8917
14	2.38	0.39	0.842	2.08	0.59	0.8833
16	2.02	0.55	0.8384	2.00	0.45	0.8858
17	1.47	-0.06	0.8502	1.69	0.07	0.8908
18	2.78	0.43	0.8406	2.92	0.34	0.8884
19	2.39	0.39	0.8416	2.44	0.54	0.884
20	2.53	0.51	0.8379	2.53	0.73	0.8803
21	2.77	0.28	0.8448	2.56	0.48	0.8849
22	1.48	0.51	0.8424	1.66	0.47	0.8863
23	2.00	0.60	0.8361	2.19	0.53	0.8841
24	2.03	0.39	0.8417	2.08	0.66	0.882
25	1.86	0.63	0.8366	1.98	0.78	0.8797
26	2.16	0.38	0.8419	2.42	0.30	0.8885
28	2.55	0.28	0.845	2.46	0.25	0.8892
29	2.59	0.26	0.8453	2.49	0.45	0.8856
30	2.94	0.18	0.8477	2.83	0.28	0.8889
31	1.94	0.44	0.8405	2.15	0.64	0.8825
32	2.27	0.42	0.841	2.39	0.67	0.8813
33	1.59	0.47	0.8419	1.78	0.72	0.8817
34	2.95	0.24	0.8459	2.76	0.49	0.885
35	1.97	0.67	0.8352	2.02	0.66	0.8822
36	1.92	0.60	0.8366	2.08	0.75	0.88

Table 9b. Criminal Thinking Styles Item Analysis without Items 1, 6, 12, 15, and 27, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.55	0.8871	2.37	0.65	0.9041
3	1.66	0.51	0.889	1.57	0.62	0.906
4	2.61	0.34	0.8913	2.67	0.39	0.9084
5	2.95	0.39	0.8902	3.02	0.43	0.9078
7	2.70	0.45	0.8894	2.37	0.64	0.9043
8	2.96	0.40	0.89	2.93	0.36	0.9088
9	2.00	0.52	0.8884	1.76	0.83	0.9036
10	2.39	0.36	0.8915	2.24	0.28	0.91
11	1.95	0.73	0.8859	2.04	0.72	0.9039
13	3.30	0.10	0.8957	3.41	0.17	0.9113
14	2.11	0.56	0.8872	1.83	0.63	0.9053
16	3.54	-0.11	0.8892	2.11	0.64	0.9045
17	2.04	0.47	0.8941	1.56	0.20	0.91
18	1.75	0.10	0.8912	2.72	0.41	0.9083
19	2.59	0.31	0.8888	2.57	0.44	0.9074
20	2.70	0.44	0.8889	2.24	0.58	0.9057
21	2.46	0.48	0.8941	2.59	0.50	0.9065
22	2.64	0.22	0.8879	1.70	0.44	0.9078
23	1.68	0.61	0.884	2.35	0.77	0.9024
24	2.21	0.69	0.8884	2.04	0.41	0.908
25	2.05	0.50	0.883	2.00	0.74	0.9039
26	2.13	0.78	0.8861	2.11	0.58	0.9054
28	2.30	0.63	0.8906	2.33	0.27	0.9103
29	2.46	0.38	0.8872	2.30	0.55	0.9058
30	2.54	0.55	0.8949	2.67	0.36	0.9086
31	2.79	0.15	0.8857	2.20	0.50	0.9066
32	2.21	0.65	0.8856	2.41	0.59	0.9053
33	2.39	0.65	0.8864	1.80	0.63	0.9052
34	1.91	0.69	0.8927	2.85	0.41	0.9077
35	2.91	0.24	0.8844	1.93	0.83	0.9018
36	2.09	0.71	0.8844	2.07	0.71	0.9036

Table 10a. Criminal Thinking Styles Item Analysis without Items 1, 6, 12, 15, 17, and 27, Sets 1 and 2

	Set 1			Set 2		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.41	0.8452	2.80	0.52	0.8863
3	1.48	0.43	0.8468	1.66	0.47	0.8886
4	2.53	0.40	0.8459	2.69	0.36	0.8896
5	2.94	0.34	0.8474	2.86	0.19	0.8936
7	2.75	0.42	0.8448	2.71	0.44	0.8881
8	3.19	0.50	0.8427	3.05	0.40	0.889
9	2.02	0.22	0.8503	1.95	0.65	0.8846
10	2.44	0.28	0.8491	2.37	0.23	0.8916
11	2.00	0.46	0.8445	2.08	0.42	0.8885
13	3.42	0.42	0.8455	3.58	0.15	0.8939
14	2.38	0.40	0.8462	2.08	0.58	0.8857
16	2.02	0.54	0.843	2.00	0.44	0.8881
18	2.78	0.42	0.8455	2.92	0.34	0.8907
19	2.39	0.38	0.8462	2.44	0.54	0.8863
20	2.53	0.51	0.8422	2.53	0.73	0.8825
21	2.77	0.27	0.8494	2.56	0.47	0.8873
22	1.48	0.50	0.8467	1.66	0.46	0.8885
23	2.00	0.59	0.8408	2.19	0.53	0.8864
24	2.03	0.40	0.846	2.08	0.66	0.8842
25	1.86	0.62	0.8413	1.98	0.77	0.8821
26	2.16	0.38	0.8463	2.42	0.31	0.8907
28	2.55	0.28	0.8495	2.46	0.25	0.8914
29	2.59	0.26	0.8498	2.49	0.45	0.8877
30	2.94	0.19	0.8518	2.83	0.29	0.8909
31	1.94	0.44	0.8449	2.15	0.64	0.8847
32	2.27	0.44	0.8451	2.39	0.67	0.8834
33	1.59	0.47	0.8463	1.78	0.72	0.8839
34	2.95	0.23	0.8504	2.76	0.49	0.8871
35	1.97	0.67	0.8395	2.02	0.65	0.8845
36	1.92	0.60	0.8409	2.08	0.75	0.8821

Table 10b. Criminal Thinking Styles Item Analysis without Items 1, 6, 12, 15, 17, and 27, Sets 3 and 4

	Set 3			Set 4		
Item	Difficulty	Discrimination	Alpha if item removed	Difficulty	Discrimination	Alpha if item removed
2	2.55	0.56	0.8892	2.37	0.65	0.905
3	1.66	0.50	0.8913	1.57	0.62	0.9069
4	2.61	0.33	0.8933	2.67	0.39	0.9092
5	2.95	0.39	0.8926	3.02	0.43	0.9087
7	2.70	0.44	0.8915	2.37	0.64	0.9051
8	2.96	0.40	0.8921	2.93	0.37	0.9096
9	2.00	0.52	0.8905	1.76	0.83	0.9046
10	2.39	0.34	0.8937	2.24	0.28	0.9108
11	1.95	0.72	0.8881	2.04	0.73	0.9046
13	3.30	0.11	0.8976	3.41	0.17	0.9121
14	2.11	0.56	0.8894	1.83	0.62	0.9064
16	2.04	0.45	0.8914	2.11	0.64	0.9054
18	2.59	0.34	0.8934	2.72	0.41	0.9093
19	2.70	0.46	0.891	2.57	0.44	0.9083
20	2.46	0.46	0.8912	2.24	0.56	0.9068
21	2.64	0.22	0.8963	2.59	0.50	0.9075
22	1.68	0.61	0.8901	1.70	0.44	0.9087
23	2.21	0.69	0.8864	2.35	0.77	0.9032
24	2.05	0.50	0.8907	2.04	0.42	0.9088
25	2.13	0.78	0.8854	2.00	0.74	0.9047
26	2.30	0.64	0.8882	2.11	0.59	0.9062
28	2.46	0.38	0.8927	2.33	0.26	0.9114
29	2.54	0.57	0.8892	2.30	0.56	0.9066
30	2.79	0.18	0.8969	2.67	0.36	0.9094
31	2.21	0.66	0.8879	2.20	0.49	0.9076
32	2.39	0.66	0.8877	2.41	0.59	0.9062
33	1.91	0.68	0.8887	1.80	0.63	0.9061
34	2.91	0.26	0.8946	2.85	0.41	0.9088
35	2.09	0.72	0.8865	1.93	0.82	0.9027
36	2.14	0.73	0.8864	2.07	0.72	0.9044

Table 11a. Correlations for Set 1

	Sex	Race	Age	CTS-r	CTS	MCAA Total	M (SD)	α
Sex	1	-.20	-.13	-.01	-.04	-.09		
Race	-.20	1	.09	.03	.00	.01		
Age	-.13	.09	1	-.14	-.14	.03	15.99 (1.32)	
CTS-r	-.01	.03	-.14	1	.97**	.48**	70.56 (13.10)	.84
CTS	-.04	.00	-.14	.97**	1	.53**	83.28 (13.37)	.83
MCAA Total	-.09	.01	.03	.48**	.53**	1	12.22 (6.83)	.85
MCAA Friends	.03	-.07	.11	.12	.11	.37**	1.39 (5.68)	
CPS Total	-.07	.03	-.22	.26*	.31*	.48**	3.94 (2.29)	.89
YPI Total	-.16	-.11	.02	.54**	.62**	.50**	101.42 (19.64)	.93
APQ parent practice	.10	.11	-.21	-.05	-.03	.12	14.78 (3.14)	.56
APQ parent process	-.01	.29*	.09	.06	.04	.16	11.09 (2.68)	.57
APQ parent positive	-.03	-.12	-.17	.02	-.06	-.12	62.02 (5.91)	.77
APQ parent monitor	-.17	-.13	.51**	-.14	-.10	.14	19.81 (4.86)	.75
APQ youth practice	-.19	.07	-.23	.28*	.27*	.38**	14.44 (3.38)	.53
APQ youth process	-.14	.18	.05	.25*	.24	.47**	11.22 (3.50)	.65
APQ youth positive	.00	.08	-.16	-.09	-.10	-.23	55.72 (8.27)	.82
APQ youth monitor	-.17	-.07	.44**	.05	.06	.43**	21.97 (5.47)	.77
PHQ total	.20	-.04	.00	.34**	.35**	.25*	7.83 (6.17)	.86
Depression [a]	.07	-.06	.10	.22	.26*	.33**	58.05 (8.59)	.85
Anxiety [a]	.13	.02	.04	.17	.20	.07	58.73 (9.28)	.82
Thought Problems [a]	-.12	.10	.13	.10	.11	.14	56.81 (7.39)	.72
Rule Breaking [a]	.10	-.11	-.12	.23	.31*	.49**	53.50 (4.98)	.75
Conduct Problems [a]	.11	-.08	-.20	.23	.31*	.44**	53.00 (4.95)	.82
ODD Problems [a]	.07	-.20	-.29*	.17	.24	.17	53.53 (4.71)	.71
RPQ PA	.10	-.05	-.11	.37**	.44**	.55**	1.19 (2.31)	.81
RPQ RA	.05	-.03	-.34**	.48**	.49**	.47**	6.86 (4.12)	.84

Note: CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; CPS = Child Psychopathy Scale; YPI = Youth Psychopathic Traits Inventory; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring; positive = positive interactions; PHQ = Patient Health Questionnaire; [a] Child Behavior Checklist scales; ODD = Oppositional Defiant Disorder; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression
*p<.05; **p<.01;

Table 11b. Correlations Set 1, continued 1

	Friends	CPS Total	YPI total	Parent practice	Parent process	Parent Positive	Parent Monitor
Sex	.03	-.07	-.16	.10	-.01	-.03	-.17
Race	-.07	.03	-.11	.11	.29*	-.12	-.13
Age	.11	-.22	.02	-.21	.09	-.17	.51**
CTS-r	.12	.26*	.54**	-.05	.06	.02	-.14
CTS	.11	.31*	.62**	-.03	.04	-.06	-.10
MCAA Total	.37**	.48**	.50**	.12	.16	-.12	.14
MCAA Friends	1	.24	.15	.03	-.08	.26*	.26*
CPS Total	.24	1	.36**	.48**	.35**	-.10	-.03
YPI Total	.15	.36**	1	.02	-.03	-.14	.11
Parent practice	.03	.48**	.02	1	.31*	-.11	-.14
Parent process	-.08	.35**	-.03	.31*	1	-.42**	.15
Parent positive	.26*	-.10	-.14	-.11	-.42**	1	-.17
Parent monitor	.26*	-.03	.11	-.14	.15	-.17	1
Youth practice	.14	.25*	.07	.27*	.12	.00	-.10
Youth process	.17	.15	.12	.08	.47**	-.05	.12
Youth positive	-.07	-.09	.09	-.01	-.21	.21	-.22
Youth monitor	.19	-.06	.15	-.14	.17	.02	.46**
PHQ total	.11	.36**	.11	.22	.37**	-.04	-.05
Depression [a]	.17	.32**	.04	.19	.32*	-.21	.14
Anxiety [a]	.02	.16	-.10	.13	.25*	-.03	-.10
Thought Problems [a]	-.11	.31*	-.04	.28*	.38**	-.06	.03
Rule Breaking [a]	.14	.75**	.37**	.28*	.31*	-.10	.00
Conduct Problems [a]	.12	.74**	.33**	.25*	.30*	-.12	-.04
ODD Problems [a]	-.11	.57**	.13	.30*	.27*	-.18	-.12
RPQ PA	.06	.37**	.50**	.11	.11	-.11	-.02
RPQ RA	.03	.48**	.33**	.10	.27*	-.03	-.08

Note: CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; CPS = Child Psychopathy Scale; YPI = Youth Psychopathic Traits Inventory; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring; positive = positive interactions; PHQ = Patient Health Questionnaire; [a] Child Behavior Checklist scales; ODD = Oppositional Defiant Disorder; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression
*p<.05; **p<.01

Table 11c. Correlations Set 1, continued 2

	Youth practice	Youth process	Youth positive	Youth monitor	PHQ total	Depression	Anxiety
Sex	-.19	-.14	.00	-.17	.20	.07	.13
Race	.07	.18	.08	-.07	-.04	-.06	.02
Age	-.23	.05	-.16	.44**	.00	.10	.04
CTS-r	.28*	.25*	-.09	.05	.34**	.22	.17
CTS	.27*	.24	-.10	.06	.35**	.26*	.20
MCAA Total	.38**	.47**	-.23	.43**	.25*	.33**	.07
MCAA Friends	.14	.17	-.07	.19	.11	.17	.02
CPS Total	.25*	.15	-.09	-.06	.36**	.32**	.16
YPI Total	.07	.12	.09	.15	.11	.04	-.10
Parent practice	.27*	.08	-.01	-.14	.22	.19	.13
Parent process	.12	.47**	-.21	.17	.37**	.32*	.25*
Parent positive	.00	-.05	.21	.02	-.04	-.21	-.03
Parent monitor	-.10	.12	-.22	.46**	-.05	.14	-.10
Youth practice	1	.50**	-.12	.12	-.03	-.08	-.16
Youth process	.50**	1	-.26*	.48**	.08	.14	.06
Youth positive	-.12	-.26*	1	-.40**	-.36**	-.13	-.18
Youth monitor	.12	.48**	-.40**	1	.14	.06	-.09
PHQ total	-.03	.08	-.36**	.14	1	.46**	.54**
Depression [a]	-.08	.14	-.13	.06	.46**	1	.55**
Anxiety [a]	-.16	.06	-.18	-.09	.54**	.55**	1
Thought Problems [a]	-.11	-.02	-.01	.10	.40**	.60**	.58**
Rule Breaking [a]	.07	.17	.02	-.02	.33**	.44**	.29*
Conduct Problems [a]	.13	.21	-.05	-.04	.32**	.32**	.27*
ODD Problems [a]	.20	.10	-.12	-.22	.37**	.24	.48**
RPQ PA	.24	.29*	.02	.13	.16	.01	.13
RPQ RA	.25*	.26*	-.04	-.05	.31*	.12	.14

Note: CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; CPS = Child Psychopathy Scale; YPI = Youth Psychopathic Traits Inventory; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring; positive = positive interactions; PHQ = Patient Health Questionnaire; [a] Child Behavior Checklist scales; ODD = Oppositional Defiant Disorder; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression
*p<.05; **p<.01

Table 11d. Correlations Set 1, continued 3

	Thought Problems	Rule Breaking	Conduct Problems	ODD Problems	RPQ PA	RPQ RA
Sex	-.12	.10	.11	.07	.10	.05
Race	.10	-.11	-.08	-.20	-.05	-.03
Age	.13	-.12	-.20	-.29*	-.11	-.34**
CTS-r	.10	.23	.23	.17	.37**	.48**
CTS	.11	.31*	.31*	.24	.44**	.49**
MCAA Total	.14	.49**	.44**	.17	.55**	.47**
MCAA Friends	-.11	.14	.12	-.11	.06	.03
CPS Total	.31*	.75**	.74**	.57**	.37**	.48**
YPI Total	-.04	.37**	.33**	.13	.50**	.33**
Parent practice	.28*	.28*	.25*	.30*	.11	.10
Parent process	.38**	.31*	.30*	.27*	.11	.27*
Parent positive	-.06	-.10	-.12	-.18	-.11	-.03
Parent monitor	.03	.00	-.04	-.12	-.02	-.08
Youth practice	-.11	.07	.13	.20	.24	.25*
Youth process	-.02	.17	.21	.10	.29*	.26*
Youth positive	-.01	.02	-.05	-.12	.02	-.04
Youth monitor	.10	-.02	-.04	-.22	.13	-.05
PHQ total	.40**	.33**	.32**	.37**	.16	.31*
Depression [a]	.60**	.44**	.32**	.24	.01	.12
Anxiety [a]	.58**	.29*	.27*	.48**	.13	.14
Thought Problems [a]	1	.35**	.24	.31*	.01	.04
Rule Breaking [a]	.35**	1	.92**	.54**	.55**	.47**
Conduct Problems [a]	.24	.92**	1	.61**	.63**	.55**
ODD Problems [a]	.31*	.54**	.61**	1	.41**	.48**
RPQ PA	.01	.55**	.63**	.41**	1	.61**
RPQ RA	.04	.47**	.55**	.48**	.61**	1

Note: CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; CPS = Child Psychopathy Scale; YPI = Youth Psychopathic Traits Inventory; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring; positive = positive interactions; PHQ = Patient Health Questionnaire; [a] Child Behavior Checklist scales; ODD = Oppositional Defiant Disorder; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression
*p<.05; **p<.01

Table 12. Incremental Validity Model 1

	RPQ PA		RPQ RA		Rule Breaking [a]		Conduct Problems [a]		ODD Problems [a]	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*p*
CTS-r	0.01	.59	0.11	.05	0.01	.76	0	.94	0.01	.73
YPI	0.05	.15	0.03	.46						
CPS					1.73	<.001	1.72	<.001	1.25	.001
MCAA Friends	-0.02	.54	-0.04	.47	-0.05	.47	-0.03	.76	-0.19	.09
APQ Youth Practice	0.07	.31	0.07	.65						
APQ Youth Process	0.12	.22	0.25	.13						
APQ Youth Positive	0.01	.82	-0.02	.79						
APQ Youth Monitor	-0.01	.92	-0.15	.12						
APQ Parent Practice					-0.18	.28	-0.26	.12	-0.01	.95
APQ Parent Process					0.12	.59	0.12	.51	0.04	.84
APQ Parent Positive					0.01	.92	-0.03	.81	-0.04	.72
APQ Parent Monitor					0.02	.90	-0.05	.70	-0.05	.71
Measures with all CTS items										
CTS	0.03	.24	0.11	.04	0.03	.36	0.02	.49	0.03	.51
YPI	0.04	.15	0.02	.60						
CPS					1.68	<.01	1.68	<.01	1.22	<.01
MCAA Friends	-0.02	.55	-0.03	.53	-0.05	.44	-0.03	.73	-0.20	.07
APQ Youth Practice	0.07	.37	0.07	.63						
APQ Youth Process	0.12	.22	0.25	.13						
APQ Youth Positive	0.02	.74	-0.01	.86						
APQ Youth Monitor	<0.01	.99	-0.15	.13						
APQ Parent Practice					-0.16	.33	-0.24	.14	0.00	1.00
APQ Parent Process					0.13	.56	0.12	.49	0.05	.80
APQ Parent Positive					0.02	.87	-0.02	.84	-0.04	.75
APQ Parent Monitor					0.02	.84	-0.04	.73	-0.05	.71

Note: 5,000 Bootstrapped samples; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression; [a] Child Behavior Check List; ODD = Oppositional Defiant Disorder; CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; YPI = Youth Psychopathic Traits Inventory; CPS = Child Psychopathy Scale; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring; positive = positive interactions

Table 13. Incremental Validity Model 2

	RPQ PA		RPQ RA		Rule Breaking [a]		Conduct Problems [a]		ODD Problems [a]	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*P*
CTS-r	0.06	.04	0.13	<.01	0.08	.11	0.07	.11	0.06	.17
MCAA Friends	-0.01	.80	-0.03	.56	0.12	.27	0.13	.08	-0.08	.21
APQ Youth Practice	0.05	.47	0.06	.70						
APQ Youth Process	0.11	.29	0.25	.13						
APQ Youth Positive	0.04	.37	0.00	.95						
APQ Youth Monitor	0.03	.49	-0.13	.13						
APQ Parent Practice					0.33	.05	0.25	.14	0.36	.09
APQ Parent Process					0.44	.07	0.44	.13	0.28	.25
APQ Parent Positive					-0.01	.92	-0.05	.68	-0.06	.62
APQ Parent Monitor					-0.01	.92	-0.08	.60	-0.07	.59
Measures with all CTS items										
CTS	0.07	.06	0.14	<.01	0.11	.04	0.10	.06	0.09	.08
MCAA Friends	-0.01	.78	-0.02	.59	0.10	.35	0.12	.12	-0.08	.17
APQ Youth Practice	0.04	.55	0.06	.66						
APQ Youth Process	0.11	.30	0.25	.13						
APQ Youth Positive	0.04	.30	<-0.01	.98						
APQ Youth Monitor	0.04	.46	-0.13	.10						
APQ Parent Practice					0.33	.05	0.26	.14	0.36	.09
APQ Parent Process					0.46	.06	0.46	.09	0.30	.21
APQ Parent Positive					0.01	.93	-0.03	.82	-0.04	.72
APQ Parent Monitor					-0.01	.95	-0.07	.62	-0.07	.62

Note: 5,000 Bootstrapped samples; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression; [a] Child Behavior Check List; ODD = Oppositional Defiant Disorder; CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring; positive = positive interactions

Table 14. Incremental Validity Model 3

	RPQ PA		RPQ RA		Rule Breaking		Conduct Problems [a]		ODD Problems [a]	
	b	*p*	*b*	*p*	*b*	*p*	*b*	*p*	*b*	*P*
CTS-r	0.05	.04	0.14	<.01	0.08	.09	0.08	.08	0.07	.11
MCAA Friends	-0.01	.84	-0.04	.40	0.11	.22	0.10	.10	-0.11	.05
APQ Youth Practice	0.04	.55	0.09	.56						
APQ Youth Process	0.12	.24	0.14	.38						
APQ Parent Practice					0.34	.04	0.28	.08	0.38	.06
APQ Parent Process					0.45	.06	0.45	.11	0.30	.19
Measures with all CTS items										
CTS	0.07	.06	0.14	.01	0.11	.04	0.11	.048	0.09	.05
MCAA Friends	-0.01	.83	-0.04	.40	0.10	.25	0.09	.12	-0.11	.047
APQ Youth Practice	0.04	.63	0.09	.53						
APQ Youth Process	0.11	.22	0.14	.39						
APQ Parent Practice					0.33	.04	0.28	.08	0.28	.06
APQ Parent Process					0.45	.04	0.45	.09	0.30	.19

Note: 5,000 Bootstrapped samples; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression; [a] Child Behavior Check List; ODD = Oppositional Defiant Disorder; CTS = Criminal Thinking Styles; -r = -revised; MCAA = Measures of Criminal Attitudes and Associates; APQ = Alabama Parenting Questionnaire; youth = youth report; parent = parent report; practice = discipline types; process = inconsistency in discipline;

Table 15. 5,000 Sample Bootstrapped Correlations and T-test Results

	Set 1 and 2 (58)		Set 1 and 3 (55)		Set 1 and 4 (54)		Set 2 and 3 (55)		Set 2 and 4 (54)		Set 3 and 4 (54)	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*P*
EN	.61	.10	.58	.04	.55	.10	.75	.46	.73	.72	.82	.75
JU	.61	.21	.67	.17	.56	.86	.74	.96	.59	.29	.79	.15
PO	.65	.77	.47	.91	.55	.55	.67	.66	.56	.23	.68	.38
PO (r)	.63	1.00	.45	.90	.53	.28	.63	.79	.55	.20	.64	.23
CH	.49	.56	.71	.09	.75	.20	.68	.36	.63	.61	.78	.66
CN	.72	.20	.64	.55	.67	.40	.78	.48	.79	.76	.84	.64
PI	.47	.38	.45	.30	.47	.95	.67	.73	.65	.31	.79	.10
Total Score	.53	.42	.48	.24	.49	.84	.67	.61	.64	.50	.85	.11
Total Score (r)	.61	.53	.54	.37	.51	.91	.74	.69	.68	.41	.86	.09

Note: p-value is in reference to the t-test, $p>.05$ is indicative of a non-significance difference between means; EN = Entitlement; JU = Justification; PO = Power orientation, CH = Cold heartedness, CN = Criminal rationalization; PI = Personal irresponsibility; (r) = revised

Table 16. Results of ICC Calculation in SPSS Using Single-Rating[a], Absolute-Agreement, 2-Way Random-Effects Mode

		95% Confidence Interval		F Test with True Value 0			
Single Measures	Intraclass Correlation	Lower Bound	Upper Bound	Value	df1	df2	Sig.
EN	.67	0.55	0.77	9.15	53.00	159.00	>.001
JU	.65	0.53	0.75	8.35	53.00	159.00	>.001
PO	.58	0.45	0.70	6.54	53.00	159.00	>.001
PO (r)	.55	0.42	0.68	5.90	53.00	159.00	>.001
CH	.67	0.55	0.77	8.95	53.00	159.00	>.001
CN	.74	0.64	0.82	12.14	53.00	159.00	>.001
PI	.59	0.47	0.71	6.79	53.00	159.00	>.001
Total Score	.60	0.48	0.72	7.04	53.00	159.00	>.001
Total Score (r)	.65	0.53	0.76	8.45	53.00	159.00	>.001

[a] Referred to as single-rating, because the scores are not averaged (Koo & Li, 2016).

Note: p-value is in reference to the t-test, $p>.05$ is indicative of a non-significance difference between means; EN = Entitlement; JU = Justification; PO = Power orientation, CH = Cold heartedness, CN = Criminal rationalization; PI = Personal irresponsibility; (r) = revised

Table 17. Multilevel Mediation with Youth Report as Independent Variable

Independent/Dependent	*a*	*b*	*c'*	*a x b*	*MCLL*	*MCUL*
MCAA Friends	.600*					
RPQ PA		*.025*	.029	**.043**	**.004**	**.099**
RPQ RA		.055***	.001	**.064**	**.006**	**.147**
ODD Problems [a]		.013	-.100	<.001	-.067	.069
Rule Breaking [a]		.077*	.203*	.031	-.023	.109
Conduct Problems [a]		.072*	*.174*	.032	-.024	.115
APQ Process – youth	-.532					
RPQ PA 1		*.025*	.004	-.013	-.044	.007
RPQ RA 1		.059***	.191*	-.031	-.088	.014
ODD Problems [a]		.015	.027	-.008	-.054	.028
Rule Breaking [a]		.084*	*.346*	-.045	-.136	.020
Conduct Problems [a]		.078*	*.293*	-.042	-.127	.019
APQ Practice – youth	*.671*					
RPQ PA		.020	.145*	.014	-.004	.040
RPQ RA		.055***	-.002	**.037**	**.001**	**.085**
ODD Problems [a]		.003	.261*	.002	-.038	.045
Rule Breaking [a]		.077*	-.048	.052	-.002	.133
Conduct Problems [a]		.070*	.020	.047	-.003	.122
APQ Positive - youth	-.487**					
RPQ PA		*.025*	-.001	-.012	-.030	.0001
RPQ RA		.059***	.038	**-.029**	**-.057**	**-.008**
ODD Problems [a]		.011	-.014	-.006	-.039	.024
Rule Breaking [a]		.091*	.088	**-.044**	**-.097**	**-.007**
Conduct Problems [a]		.076*	.027	**-.037**	**-.085**	**-.004**
APQ Monitor - youth	.697**					
RPQ PA		.019	.085*	.013	-.004	.036
RPQ RA		.047**	.112*	**.033**	**.007**	**.068**
ODD Problems [a]		.028	-.135	.020	-.020	.069
Rule Breaking [a]		.078*	-.014	**.054**	**.004**	**.124**
Conduct Problems [a]		.075*	-.039	**.053**	**.005**	**.120**

Note: For all analyses Criminal Thinking Styles is the mediator; Controlled for set number (i.e., time); *c'* = total effect; *a x b* = indirect effect estimates; MCLL = Monte Carlo Lower Limit; MCUL = Monte Carlo Upper Limit; Bolded results mark those that are significant according to the 10,000 Monte Carlo simulations 95% confidence interval. If a confidence interval does not include 0, then the estimated coefficient is significant at the $p < .05$ level.

MCAA = Measures of Criminal Attitudes and Associates; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression; [a] Child Behavior Check List; ODD = Oppositional Defiant Disorder; APQ = Alabama Parenting Questionnaire; youth = youth report; practice = discipline types; process = inconsistency in discipline; positive = positive interactions; monitoring = poor monitoring

Italicized values $p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 18. Multilevel Mediation with Parent Report as Independent Variable

Independent/Dependent	*a*	*b*	*c'*	*a x b*	*MCLL*	*MCUL*
APQ Process – parent	-.466					
RPQ PA		.027*	.062	-.013	-.053	.017
RPQ RA		.059***	*.200*	-.027	-.101	.035
ODD Problems [a]		.019	.134	-.009	-.063	.030
Rule Breaking [a]		.079*	.019	-.037	-.149	.049
Conduct Problems [a]		.073*	.001	-.034	-.139	.046
APQ Practice – parent	-.306					
RPQ PA		.026*	<.001	-.008	-.038	.015
RPQ RA		.057***	.062	-.018	-.073	.030
ODD Problems [a]		.014	.038	-.004	-.042	.023
Rule Breaking [a]		.075*	.100	-.023	-.104	.041
Conduct Problems [a]		.069*	.044	-.021	-.097	.038
APQ Positive – parent	.087					
RPQ PA		.027*	-.047	.002	-.014	.021
RPQ RA		.057***	-.025	.005	-.028	.040
ODD Problems [a]		.014	-.026	.001	-.016	.022
Rule Breaking [a]		.074*	.131	.007	-.039	.056
Conduct Problems [a]		.070*	.086	.006	-.037	.053
APQ Monitor - parent	.746*					
RPQ PA		.027*	-.014	.020	-.001	.052
RPQ RA		.054**	.051	**.040**	**.004**	**.090**
ODD Problems [a]		.003	.105	.003	-.044	.052
Rule Breaking [a]		.074*	.022	.055	-.0001	.138
Conduct Problems [a]		.071*	-.004	**.053**	**.0001**	**.132**

Note: For all analyses Criminal Thinking Styles is the mediator; Controlled for set number (i.e., time); *c'* = total effect; *a x b* = indirect effect estimates; MCLL = Monte Carlo Lower Limit; MCUL = Monte Carlo Upper Limit; Bolded results mark those that are significant according to the 10,000 Monte Carlo simulations 95% confidence interval. If a confidence interval does not include 0, then the estimated coefficient is significant at the $p < .05$ level.

MCAA = Measures of Criminal Attitudes and Associates; RPQ = Reactive Proactive Questionnaire; PA = Proactive Aggression; RA = Reactive Aggression; [a] Child Behavior Check List; ODD = Oppositional Defiant Disorder; APQ = Alabama Parenting Questionnaire; parent = parent report; practice = discipline types; process = inconsistency in discipline; positive = positive interactions; monitoring = poor monitoring

Italicized values $p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 19. Temporal Mediation with Reactive Aggression as the Dependent Variable

X = Independent Variable	Predicting CTS2	Predicting CTS3	Reactive Aggression (Y)	Total effect	Indirect effect *b* (90% CI)
MCAA Friends (X)	.542*	.282	.073[a]	.100	.039 (.002, .162)
CTS1	.471***	.197	.081*		
CTS2		.548***	-.064		
CTS3			.130*		
CTS4			-.054		
APQ Process Youth (X)	1.327**	*.776*	.126[a]	*.203*	.085 (.015, .281)
CTS1	.428**	.191	.081*		
CTS2		.505***	-.066		
CTS3			.127*		
CTS4			-.054		
APQ Monitor Youth (X)	.477	.340	-.096[a]	-.059	.035 (.002, .145)
CTS1	.495***	.206	.073*		
CTS2		.551***	-.055		
CTS3			.135*		
CTS4			-.040		

Note: [a] direct effect of X on Y; indirect effect estimates based on 10,000 bootstrapped samples; If a confidence interval does not include 0, then the estimated coefficient is significant at the $p < .05$ level.

CTS = Criminal Thinking Styles; MCAA = Measures of Criminal Attitudes and Associates; APQ = Alabama Parenting Questionnaire; youth = youth report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring

Italicized values $p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 20. Temporal Mediation with Proactive Aggression as the Dependent Variable

X = Independent Variable	Predicting CTS2	Predicting CTS3	Proactive Aggression (Y)	Total effect	Indirect effect *b* (90% CI)
APQ Process Youth (X)	1.327**	*.776*	.093[a]	.117	.045 (.005, .158)
CTS1	.428**	.191	.049*		
CTS2		.505***	-.064*		
CTS3			*.067*		
CTS4			-.014		
APQ Monitor Youth (X)	.477	.340	.053[a]	.061	.018 (.001, .078)
CTS1	.495***	.206	.051*		
CTS2		.551***	-.061*		
CTS3			*.069*		
CTS4			-.014		

Note: [a] – direct effect of X on Y; indirect effect estimates based on 10,000 bootstrapped samples; If a confidence interval does not include 0, then the estimated coefficient is significant at the $p < .05$ level.

CTS = Criminal Thinking Styles; APQ = Alabama Parenting Questionnaire; youth = youth report; practice = discipline types; process = inconsistency in discipline; monitoring = poor monitoring

Italicized values $p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$

Table 21. Summary of Mediation Analyses

Multi-Level Mediation only	Both tests of mediation	Temporal Mediation only
Friends – PA	MCAA Friends – RA	APQ Processes (Y) – RA
APQ Practices (Y) – RA	APQ Monitoring (Y) – RA	APQ Processes (Y) – PA
APQ Positive (Y) – RA		APQ Monitoring (Y) - PA
APQ Positive (Y) – rule breaking [a]		
APQ Positive (Y) – conduct problems [a]		
APQ Monitoring (Y) – rule breaking [a]		
APQ Monitoring (Y) – conduct problems [a]		
APQ Monitoring (P) – RA		
APQ Monitoring (P) – conduct problems [a]		

Note: MCAA = Measures of Criminal Attitudes and Associates; PA = Proactive Aggression; RA = Reactive Aggression; APQ = Alabama Parenting Questionnaire; (Y) = Youth report; (P) = Parent report; [a] Child Behavior Check List; ODD = Oppositional Defiant Disorder; youth = youth report; practice = discipline types; process = inconsistency in discipline; positive = positive interactions; monitoring = poor monitoring

FIGURES

Figure 1. Graphic of Risk-Needs-Responsivity Model

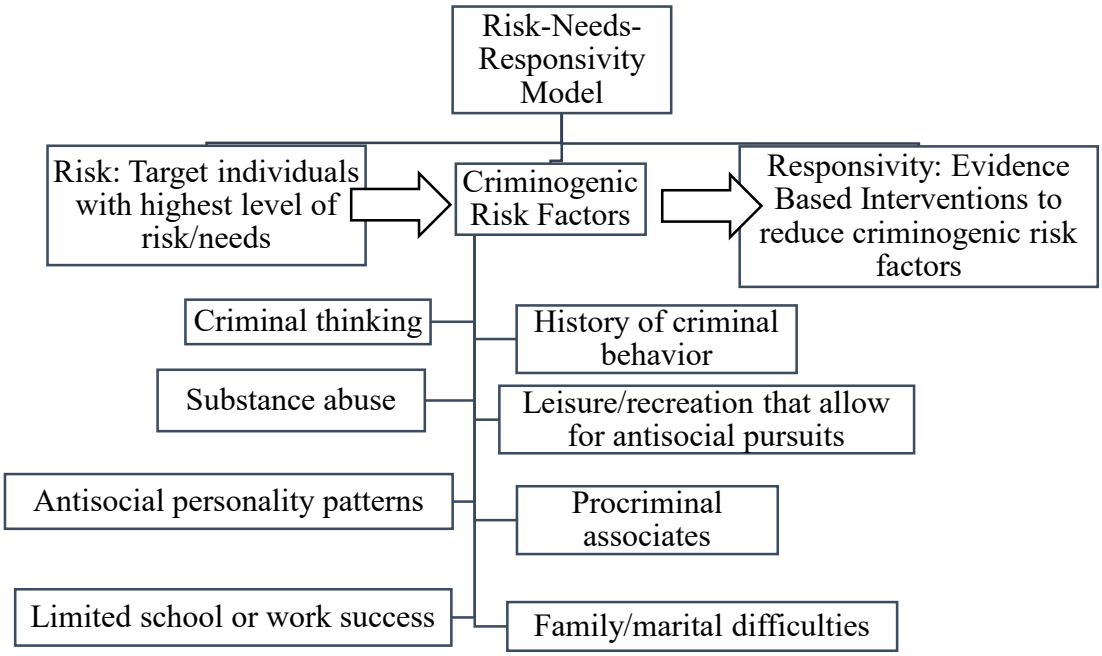


Figure 2. Forms of Criminal Thinking

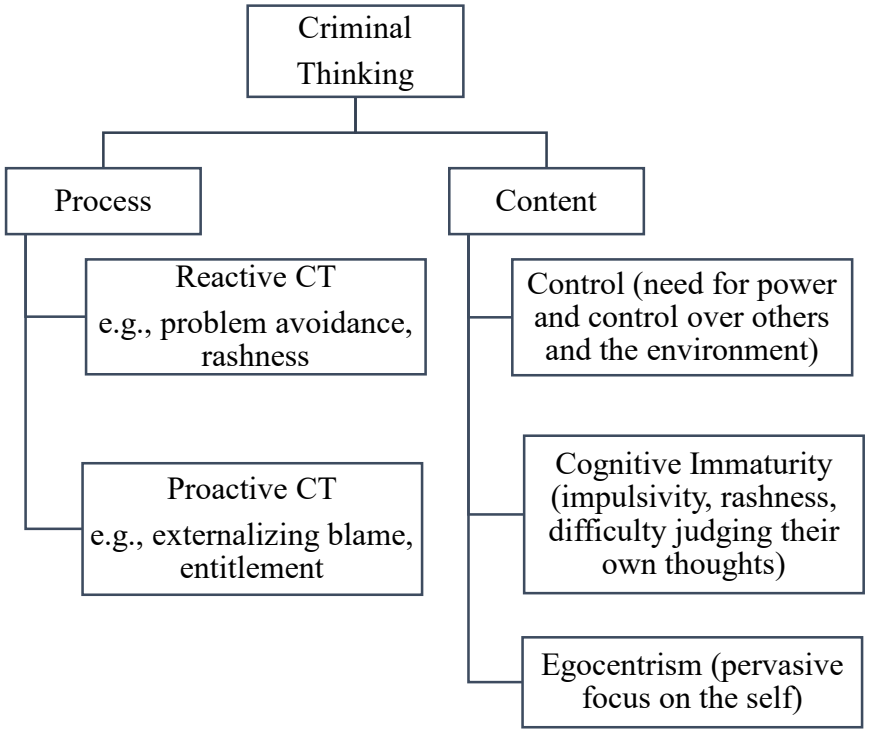


Figure 3. Example Mediation Model

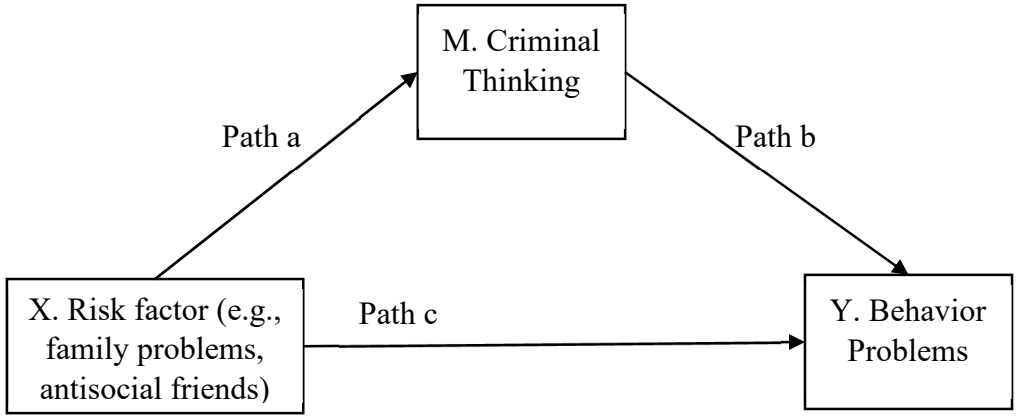


Figure 4. Multilevel Modeling Mediation Analysis with Two Levels

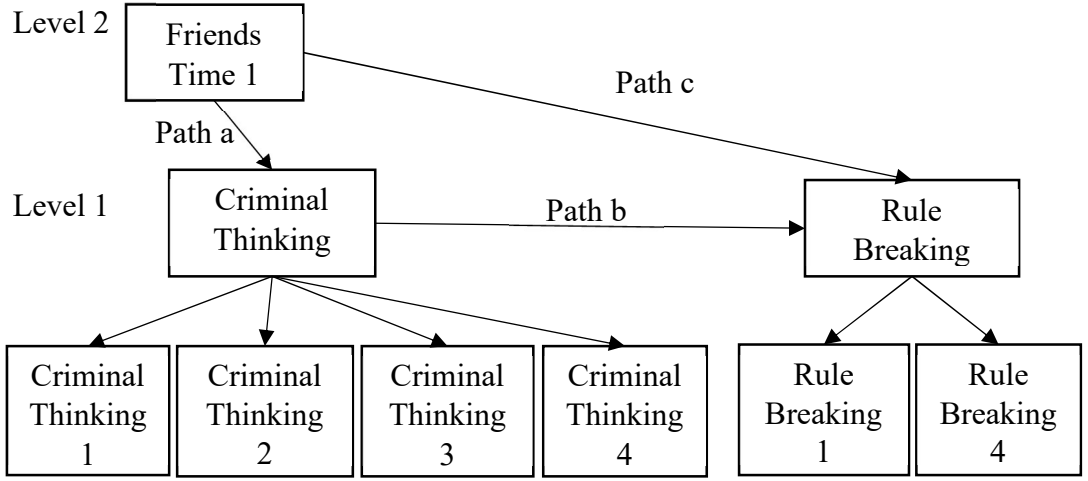
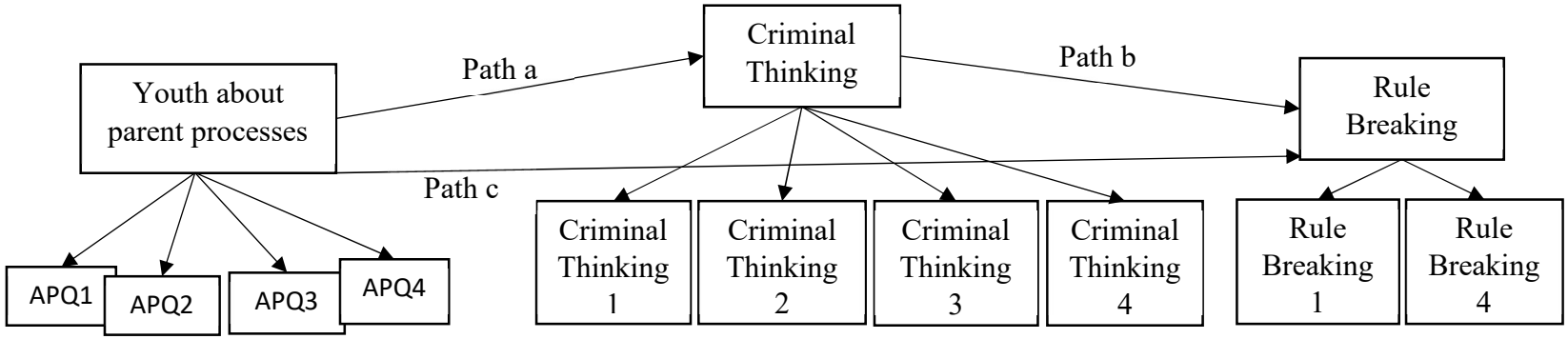


Figure 5. Multilevel Modeling Mediation Analysis with One Level



Note: APQ = Alabama Parenting Questionnaire

Figure 6. Temporal Mediation Analysis