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ELEVATED ADHD SYMPTOMS AS A PREDICTOR OF RULE VIOLATIONS AMONG MALE JUVENILE OFFENDERS

by

Kathleen Lolley Ramsey

A Thesis
Submitted to the Graduate School,
the College of Education and Human Sciences
and the School of Psychology
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Master of Arts

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ABSTRACT

Youth with ADHD are disproportionately at-risk for engaging in criminality and aggression relative to the general population, and this may be a function of underlying executive function deficits associated with self-regulation. More specifically, youth with ADHD may be susceptible to difficulties with behavioral regulation (impulsivity) and emotional regulation (e.g., managing feelings of anger). The current study sought to expand on previous research to examine the relationship between ADHD symptoms and aggression and the potential moderating effects of anger control among institutionalized youth. Archival data comprising a sample (N=119) of male adolescents who were admitted to a maximum-security residential facility were analyzed for the purposes of this study. Youths completed measures assessing ADHD symptoms, trait anger, and anger control upon admission. Research assistants coded rule violating behaviors across twelve behavioral categories (e.g., noncompliance, disruptive behavior) based on a categorization framework developed by the research team. Aggression was operationalized by the total number of rule violations documented by facility staff across four behavior categories (i.e., physical aggression, verbal aggression, destructive behavior, threatening behavior), and aggression toward people was operationalized as a composite measure of physical aggression and threatening behaviors. Although results revealed that youths with elevated ADHD symptomatology and higher trait anger scores were more likely to commit rule violations while initially adjusting to the facility, anger control was not found to be a moderator of the relationship between ADHD symptoms and rule violations. These findings suggest that youths with less behavioral control and a
chronic tendency to feel anger are more prone to engaging in a variety of rule-violating behaviors while incarcerated.
ACKNOWLEDGMENTS

I would like to express my sincere appreciation and gratitude for my committee chair and major professor, Dr. Stephanie Smith. She has invested much of her time and effort into my success and has challenged me to think critically throughout this entire process. I would also like to thank my thesis committee members, Dr. Nora Charles and Dr. Ashley Batastini, who have provided me invaluable feedback for my thesis project. Having the perspective of researchers from various backgrounds has proven invaluable. Next, I am incredibly grateful to have been surrounded by such supportive colleagues within my department. Finally, I would like to thank Kaldi, the Ethiopian goat herder who (according to legend) discovered coffee.
DEDICATION

This thesis project is dedicated to my husband, Whitson, who serves as a consistent reminder for me to persevere in spite of self-doubt. I would also like to dedicate this document to my parents, Heather and Steve, who have always supported my every endeavor. Thank you all for inspiring me to work toward a dream I have had since I was a child. I hope to continue to make you proud.
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<th>Description</th>
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<tr>
<td>USM</td>
<td>Attention-Deficit/Hyperactivity Disorder</td>
</tr>
<tr>
<td>APS</td>
<td>Adolescent Psychopathology Scale</td>
</tr>
<tr>
<td>CD</td>
<td>Conduct Disorder</td>
</tr>
<tr>
<td>IRR</td>
<td>Incidence Rate Ratios</td>
</tr>
<tr>
<td>JO</td>
<td>Juvenile Offender</td>
</tr>
<tr>
<td>ODD</td>
<td>Oppositional Defiant Disorder</td>
</tr>
<tr>
<td>STAXI</td>
<td>State Trait Anger Expression Inventory</td>
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CHAPTER I – INTRODUCTION

Juvenile delinquency is an ongoing societal problem that has detrimental effects at the individual, family and community level. Despite advancements in the aggression literature, further clarifications must be made to determine what factors predict aggression within high-risk populations. Previous research has not thoroughly investigated the relationship between psychopathology and aggression in high-risk youth, and studies examining this relationship in less severe populations should not be generalized to juvenile offenders because variables predicting aggression (e.g., emotion dysregulation; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011) may vary across populations. Additionally, with few exceptions (e.g., Cornell, Peterson, & Richards, 1999), prior studies attempting to predict aggression in specialized populations often rely on self-report measures to assess this construct rather than more objective methods such as behavioral observations. To address these gaps in the literature, the primary aim of this study is to determine how ADHD symptoms and emotion regulation predict subsequent observed aggressive behaviors in a sample of juvenile offenders within a maximum security residential facility. Because ADHD is associated with engaging in criminality at a young age (Retz et al., 2004), and increases the risk for recidivism (González, Gudionsson, Wells, & Young, 2016), it is especially important to understand what predicts future aggressive behaviors among juvenile offenders to enhance prevention efforts to avoid the risk of them reoffending in adulthood.

Theories of Aggression

Various theories have been proposed to understand why youth act aggressively, and more recently, comprehensive models of aggression have been developed to more
thoroughly elucidate the interactions between situational, biological, and individual risk factors and how they may lead to the development of this maladaptive outcome. Serving as an integrative framework for understanding human aggressive behavior, the General Aggression Model (GAM; Anderson & Bushman, 2002) posits that situational factors (e.g., provocation) influence one’s emotional state and cognitive processes (e.g., experience of anger and reappraisal of angering events; Anderson, Buckley, & Carnagey, 2008). The experience of anger can lead to the development of aggressive schemata and behavior scripts, preparing an individual to misinterpret others’ behaviors as hostile and to respond in an aggressive manner. In the context of the general aggression model, anger is a fundamental predictor of aggression. Further, the heightened experience of anger may restrict an individual’s ability to cognitively reappraise situations, diminish the ability to inhibit aggressive responses, and allow for the defensibility of aggressive acts. An inability to regulate the experience of anger and carefully reassess situations increases the risk of youths reacting aggressively (Denson, Pedersen, Friese, Hahm, & Roberts, 2011). According to the GAM, a failure to effectively regulate anger may ultimately lead to aggression towards others through a “feedback loop” (DeWall, Finkel, & Denson, 2011; Wang et al., 2018). In this feedback loop, a maladaptive reappraisal of situational factors such as assuming the intentions of others as hostile (e.g., hostile attribution bias) or perseverating on an anger-invoking situation (e.g., anger rumination) primes an aggressive response by heightening feelings of anger that may be either positively reinforced (e.g., attaining a certain goal) or negatively reinforced (e.g., avoiding negative consequences; Anderson & Buschman, 2002; DeWall et al., 2011), thus enhancing the likelihood of such a response in the future.
In the context of GAM, the appraisal process, which is influenced by situational variables that impact one’s internal state (i.e., anger; Fives, Kong, Fuller, & DiGiuseppe, 2011), may result in actions that are either thoughtful or impulsive (Allen, Anderson, & Bushman, 2018). Depending on the context of a given situation (e.g., if it is interpreted as hostile), impulsive actions are more likely to be aggressive (MacDonald, 2008; Ramirez & Andreau, 2006), and these aggressive behaviors are often reinforced through the acquisition of a desirable outcome or the lack of ramifications. Once aggressive responses are reinforced, aggression increasingly becomes an automatic, primary response to situational factors. In fact, behavioral self-control has been identified as a risk factor associated with aggression, and aggressive acts are often the outcome of a pursuit for immediate gratification (Derefinko, DeWall, Metze, Walsh, & Lynam, 2011). Furthermore, the function of aggression can be explained by impulsive responses to perceived threats in the environment (Bailey & Ostrov, 2008).

Previous research supports this model in typically developing youth, as anger has been found to be a crucial factor predicting aggression in adolescents (Fives et al., 2011) and in children (Hubbard et al., 2002). Moreover, the incapacity to regulate and cope with anger has been implicated in increasing aggressive behaviors (Kuzucu, 2016; McLaughlin et al., 2011; Sullivan, Helms, Kliwer, & Goodman, 2010). Specifically, in a sample of adolescents, the regulation of anger as assessed by a self-report measure (i.e., Anger Regulation Coping subscale of the Children’s Anger Management Scale) was found to be associated with both physical and relational aggression (Sullivan et al., 2010). Additionally, a relationship between impulsivity and aggression has been established in the extant literature among adolescents (Duran-Bonavila, Morales-Vives, Cosi, & Vigil-
Colet, 2017). Indeed, it was found that higher levels of self-reported impulsivity (assessed with the Barratt Impulsiveness Scale-11) was positively associated with self-reported physical and verbal aggression (measured with the Indirect-Direct Aggression Questionnaire).

**ADHD and Aggression.** Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity (Clark, Prior, & Kinsella, 2000). Barkley’s (2011) model of self-control and ADHD conceptualizes ADHD as a “disorder of self-regulation” in which self-regulatory skills rely on well-developed executive functions. These executive functions refer to abilities (e.g., organization, working memory, modulation of emotions and actions) that guide goal-directed behavior (Biederman et al., 2004). Clark and colleagues (2000) have found that adolescents with ADHD do not perform as optimally as those without ADHD on neuropsychological measures of executive functions. Specifically, they evidence impairments on tasks of planning and performance monitoring (Wilcutt, Doyle, Nigg, Faraone, & Pennington, 2005). Because some youth with ADHD have impaired executive functions (Barkley, 1997), they often have difficulties regulating their emotions (Sjöwall, Roth, Lindqvist, & Thorell, 2013) and behaviors (Shiels & Hawk, 2010).

Barkley (2011) perceives impulsivity, a core symptom of ADHD, as a manifestation of dysregulated behavioral inhibition processes in youth with ADHD. Deficits in behavioral regulation may be evidenced by insufficient self-monitoring and adaptive control processes in youth with ADHD (Sheils & Hawk, 2010). Indeed, youth with ADHD tend to have difficulties evaluating their own behavior in relation to contextual
information (i.e., self-monitoring), thus preventing them from adjusting their behavior accordingly (i.e., adaptive control). Because self-monitoring and adaptive control are necessary in inhibiting responses, individuals with deficits in these areas often act impulsively and are at increased risk of engaging in maladaptive behavioral responses including various forms of aggression (e.g., reactive/proactive, overt/relational; Barkley, 1997; Becker, Luebbe, Stoppelbein, & Fite, 2012). Cross-sectional research supporting the association between self-reported impulsivity (assessed using the Impulsivity Rating Scale) and aggression has found a significant and positive relationship between these variables of interest in adolescents (Askénazy, Sorci, Benoit, Lestideau, Myquel, & Lecrubier, 2003; Piko & Pinczés, 2014; Saylor & Amann, 2016). Additionally, in a sample of preschool children, those with elevated scores on teacher ratings of aggressive behaviors showed poorer performance on neuropsychological tasks of behavioral inhibition as compared to typically developing children (Raaijmakers et al., 2008).

Furthermore, in high-risk youth with disruptive behavior disorders, a link has been established between anger, aggression, and ADHD (Harty, Miller, Newcom, & Halperin, 2009). Harty and colleagues (2009) employed a longitudinal design to examine the relationship between self-reported aggression, hostility, and trait anger in a sample of male adolescents who met diagnostic criteria for ADHD and a co-occurring disruptive behavior disorder during childhood. Results found that those youths with a diagnosis of ADHD and comorbid Oppositional Defiant Disorder (ODD) or Conduct Disorder (CD) reported elevated levels of physical aggression, verbal aggression, and anger as compared to typically developing adolescents with no psychological diagnosis. When controlling for adolescent ADHD symptom severity, results suggested that ADHD symptoms
persisting into adulthood explained differences in the levels of verbal aggression and anger.

*Emotion Regulation and Aggression.* Emotion regulation is the process of responding to emotional experiences through intensification (i.e., exacerbating negative emotion), mitigation (i.e., alleviating negative emotion), or maintenance (i.e., preserving negative emotion; Davidson, Putnam, & Larson, 2000). Engaging in emotion regulation involves effectively adjusting or coping with the experience of negative emotions (e.g., anger) to appropriately react to situations. Past research has found a notable relationship between emotion dysregulation and aggression, where the under-regulation (i.e., maintenance or intensification) of anger is noted as one of the primary predictors of aggressive behavior (Roberton, Daffern, & Bucks, 2012).

Maladaptive anger regulation has been found to be related to aggressive behavior in children (Rohlf, Busching, & Krahé, 2017) and adolescents (McLaughlin et al., 2011). A study by Rohlf and colleagues (2017) found that deficits in anger regulation, assessed by a behavioral coding system (i.e., observation of children’s responses including verbal and physical expressions of anger, resignation, etc.) following an anger-eliciting task, was associated with elevated levels of teacher-reported aggressive behaviors. Additionally, longitudinal research has found that self-reported emotion dysregulation (characterized by poor emotional understanding, dysregulated emotion expression, and rumination) predicted self-reported aggression in adolescents (McLaughlin et al., 2011). Finally, research involving a sample of college students has found that anger regulation, assessed through reduced self-reported motivation to retaliate following an anger-eliciting task, is
predictive of less aggressive responses (i.e., less intense noise blasts) in response to provocation (Wilkowski, Robinson, & Troop-Gordon, 2010).

**Interplay between ADHD, Anger Control, and Aggression.** Interestingly, a link has been established between ADHD and both the heightened experience (Harty et al., 2009) and expression of anger (Braaten & Rosén, 2000) in males. In fact, research has found that anger is felt more intensely in those with ADHD relative to those without ADHD (Wheeler & Carlson, 2000). Furthermore, youth with ADHD often struggle with the regulation of anger (Sjöwall et al., 2013), and the likelihood of engaging in aggression is thought to be exacerbated by the ineffective regulation of negative emotions (Davidson et al., 2000). Although not all individuals with ADHD have difficulties regulating emotions, 25-45% of children and 30-70% of adults with ADHD experience emotion dysregulation (Shaw, Stringaris, Nigg, & Leibenluft, 2014), and co-occurring aggressive behaviors are often representative of those with the disorder (Martel, 2009; Walcott & Landau, 2004). Anderson and Carnagey (2004) suggest that ADHD exerts a chronic influence on an individual’s tendency to be aggressive by activating aggression-related scripts and negatively influencing one’s capacity to suppress aggressive urges. Because emotion (i.e., anger control) and behavior (i.e., impulsivity) regulation deficits have both been found to predict aggression in males (Séguin, Pihl, Harden, Tremblay, & Boulerice, 1995), and ADHD may decrease the capacity for these forms of self-regulation, male youth with severe ADHD symptoms may be more likely to engage in aggression (Holley et al., 2017; Shaw et al., 2014).

**ADHD, Anger Control, and Aggression in Juvenile Offenders.** ADHD prevalence rates among adjudicated youth (30.1%) is exceptionally higher than in the general
population (3-7%; Young, Moss, Sedgwick, Fridman, & Hodgkins, 2015). Moreover, numerous studies have found that juvenile offenders with ADHD symptoms are especially likely to have extensive histories of adjudicated violent offenses (González et al., 2016), are behaviorally disruptive (Young, Misch, Collins, & Gudjonsson, 2011), and are more likely to engage in aggressive acts within institutional settings than juvenile offenders without ADHD (Cornell et al., 1999). Given these findings, it seems that youth with ADHD are exceptionally at-risk of becoming involved with the juvenile justice system (Aguilar-Cárceles & Farrington, 2017; Retz et al., 2004).

Previous research on juvenile offender populations has established a connection between ADHD and the participation in and frequency of violent offences, which has been theorized to originate from symptoms of impulsivity (Wojciechowski, 2017). In a study examining ADHD as a risk factor for violent offences, Wojciechowski and colleagues (2017) found that juvenile offenders meeting criteria for ADHD at baseline were at an increased risk of engaging in violent offenses persistently across their lifetimes. Wojciechowski and colleagues (2017) posit that impulsivity has been found to increase the proclivity to engage in violent offending because of insufficient behavioral self-control (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). Additionally, a poorer performance on laboratory tasks of response inhibition and clinical levels of impulsivity have been found to predict self-reported delinquent acts across several forms of offending (e.g., assault and battery, larceny, property damage/vandalism; Carroll et al., 2006).

Research has also found that heightened levels of experienced anger in conjunction with deficits in emotion regulation predict violent behaviors (i.e., fighting, threatening
with a weapon, or physically injuring others) in juvenile offenders, suggesting that problems regulating negative emotionality are of notable concern (Miller, Vachon, & Aalsma, 2012). Such a notion is further supported by studies with high-risk adolescents suggesting that difficulties perceiving and controlling emotions is a risk factor for arrest with respect to both violent and property offenses (Kemp et al., 2017). Because research has evidenced a fivefold increase in the prevalence of ADHD in juvenile offender populations relative to the general population (Young et al., 2015), it is plausible that elevated ADHD symptoms in combination with the inability to effectively control anger may predict aggressive behaviors in this high-risk group of adolescents.

**Current Study.** The present study aims to identify potential risk factors of aggression in male juvenile offenders to determine appropriate targets for treatment. Although advances have been made in the extant literature investigating aggression in clinical populations (e.g., youth with ADHD, conduct problems), some gaps remain in our understanding of risk factors of aggression among juvenile offenders. This study adds to the extant literature in three central ways: First, a more ecologically valid method was used to measure aggression. Aggressive acts were captured by means of observed rule violations by facility staff versus relying on self-report measures of aggression (e.g., Fives et al., 2011; Harty et al., 2009; Holley et al., 2017); measures that have been used in the majority of studies examining juvenile offenders and pose the risk for self-report bias in which behaviors are under-reported (e.g., social desirability bias) or over-reported (e.g., negative response bias). Second, this study investigated whether elevated ADHD symptoms predict aggression among juvenile offenders, as this relationship has been understudied in this high-risk group of adolescents. Although more research in this area
has been done among adult offenders, these findings may not generalize well to juvenile offenders, as these youth often commit offenses that are opportunistic and impulsive by nature as compared to adult offenders (Richards, 2011). Additionally, many juvenile offenders discontinue offending upon reaching adulthood, further supporting the notion that juvenile offenders need to be studied separately from adult offenders (Moffitt, 2017). Third, this study examined whether deficits in emotion regulation (i.e., low anger control) strengthen the relationship between elevated ADHD symptoms and aggressive behaviors within the residential facility. Although past research has found that emotion dysregulation predicts an increase in aggression (Davidson et al., 2000) and individuals with ADHD are especially likely to aggress (Becker et al., 2011), the interplay between these variables of interest has not been investigated within a sample of juvenile offenders. It is essential to have a more thorough understanding of how ADHD symptoms and anger control are related to aggressive behavior within a high-risk population of juvenile offenders, as this information may have important implications for the improvement of rehabilitation efforts (Roberton et al., 2015).

Given that ADHD is conceptualized as a disorder of self-regulation (Barkley, 2011) and both anger control (Davidson et al., 2000) and impulsivity (Clark et al., 2000; Young et al., 2011) are factors that have been found to predict aggression (Holley et al., 2017; Séguin et al., 1995), it is hypothesized that elevated ADHD symptoms and poor anger control will predict subsequent aggressive behavior in the first month of juvenile offenders’ arrival to a maximum security residential facility. This one month time frame was selected for the purpose of this study, as it was before any therapeutic interventions had begun for newly admitted youth, thus reducing the potential influence of treatment on
our variables of interest (Smith, 2012). Although not all youth with ADHD have difficulties with emotion regulation (i.e., poor anger control), those with these deficits in addition to having poor behavioral self-control associated with the disorder may be more likely to engage in aggression. Thus, it is predicted that anger control will moderate the relationship between ADHD symptoms and aggressive behaviors, such that this relationship will be stronger for juvenile offenders who have less anger control. These associations are expected to remain significant even after taking into account variables (i.e., trait anger, symptoms of ODD and CD) that are predictive of this outcome of interest (Loeber, Burke, Lahey, Winters, & Zera, 2000; Wilkowski & Robinson, 2008). The focus on male juvenile offenders in this study was felt to be justifiable given the higher prevalence rates of ADHD and conduct disorders in males (Rösler et al., 2004) and their greater tendency to exhibit externalizing behaviors (Eaton et al., 2012), so associations between our study variables were more likely to be found.
CHAPTER II – METHODS

Participants

Archival data comprising a sample of 119 male adolescents who were admitted to a maximum-security residential facility in a southeastern state in the United States were used in the present study. The youths incarcerated in this residential facility had a persistent criminal history and were adjudicated for at least one felony. They were 14.37 years of age (SD=1.78) on average when they committed their first adjudicated offense and were adjudicated for an average of 9 offenses. Of these adjudicated offenses, 18% were violent offenses, 39% were property offenses, 2% were drug offenses, and 41% were miscellaneous offenses (i.e., probation violations). With regard to committing offenses, 19% were violent offenses, 52% were property offenses, 5% were drug offenses, and 24% were probation violations. Of the youths in our sample, only 3 were committed to the facility for probation violations whereas the remaining sample had at least one other misdemeanor or felony as a committing offense. Youths had a mean age of 16.74 years (Range=14-18) with 30% identifying as white and 70% identifying as black. On average, the reading level of youths in the sample (in terms of grade equivalency) was 6.65 (SD=3.10), and 76% were enrolled in the tenth grade or higher upon entry to the residential facility.

Self-Report Questionnaires

State Trait Anger Expression Inventory-2, Child/Adolescent Version (STAXI-2 C/A). The STAXI-2 C/A (Brunner & Spielberger, 2009), adapted from the STAXI-2, is a 35-item inventory used to assess state anger, trait anger, anger expression, and anger control in children and adolescents between 9-18 years of age. Internal consistency alpha
coefficients for the STAXI-2 C/A scales for the normative sample are as follows: .87 for state anger, .80 for trait anger, .70 for anger expression-out, .71 for anger expression-in, and .79 for anger control. Internal consistency alpha coefficients for the STAXI-2 C/A scales for a clinical sample of youths with disruptive behaviors are as follows: .94 for state anger, .88 for trait anger, .84 for anger expression-out, .74 for anger expression-in, and .89 for anger control. In this clinical sample, the STAXI-2 C/A demonstrated good convergent validity (i.e., strong positive correlations between the Aggressive and Externalizing Behavior scales on the Achenbach’s Youth Self-Report [YSR] and the Anger Expression-Out and Trait Anger scales on the STAXI-2 C/A) and divergent validity (i.e., weak relationships between the previously mentioned scales on the YSR and Anger Expression-In and Anger Control scales on the STAXI-2 C/A). No studies have investigated the stability of STAXI-2 C/A scores, although previous research on the STAXI and STAXI-2 (Schamborg, Tully, & Browne, 2016; Spielberger, 1999) suggests strong stability ($r=.62-.81$) of Trait scales over time. The Anger Control (AC) subscale was used for the purposes of this study to measures youths’ ability to control anger by inhibiting the outward expression of anger (e.g., *I try to calm down my angry feelings*). Additionally, the Trait Anger (T-Ang) subscale was used as a covariate for this study to measure individual differences in youths’ proneness to feelings of trait anger (e.g., *I get angry quickly*). Results of Cronbach’s alpha revealed good internal consistency for items comprising the trait anger ($\alpha=.84$) and anger control ($\alpha=.86$) scales of the STAXI 2-C/A.

*Adolescent Psychopathology Scale (APS) and APS – Short Form (APS-SF).* Considering intake procedures changed in the residential facility over time, some youth were administered the APS, and others were administered the APS-SF as part of their
intake battery. The APS (Reynolds, 1998a) and APS-SF (Reynolds, 1998b) are respectively 346-item and 115-item measures used to evaluate the presence and severity of psychological symptoms in adolescents aged 12 to 19 years. The APS and APS-SF include validity scales which identify inconsistent (Consistency Response; CNR) and overly desirable (Defensiveness; DEF) response styles to ensure the validity of youth’s responses. For CNR, scores at and above 70 may mean that respondents were careless, inattentive, or dissimulating; 4 (3.3%) of the youths in this sample were inconsistent in their responses. For DEF, scores at and above 65 should prompt caution when interpreting scores; 8 (6.4%) of the youths in this sample were overly defensive in their responses. The APS is comprised of 36 clinical scales which assess three domains: clinical disorders (e.g., attention-deficit/hyperactivity disorder, conduct disorder), personality disorders (e.g., borderline, obsessive-compulsive), and psychosocial problems (e.g., self-concept, emotional lability). For the APS, internal consistency alpha coefficients for the clinical scales ranged from .69 to .95. Further, the APS demonstrates moderately strong criterion-related validity with the Minnesota Multiphasic Personality Inventory (MMPI), with correlation coefficients ranging from .77 to .82. The APS-SF is an abbreviated version of the APS (i.e., one third of its length) and is comprised of 12 clinical scales (e.g., Academic Problems, Oppositional Defiant Disorder, Conduct Disorder) which assess DSM-IV symptoms and psychosocial problems. Internal consistency alpha coefficients for the APS-SF clinical scales in a standardization sample range from .80 to .91, and those in a clinical sample range from .82 to .91. The APS-SF has good test-retest reliability for clinical scales, with reliability coefficients ranging from .76 to .91, and most coefficients falling at or above values of .82. Further, the APS-SF
demonstrates moderately strong criterion-related validity with the MMPI. In a sample of juvenile offenders, the APS-SF scales were found to be positively and significantly correlated with almost all diagnoses assessed via the Structured Clinical Interview for DSM-IV Childhood Diagnoses (KID-SCID; Drew, 2009). Specifically, the Academic Problems scale of the APS-SF was found to be moderately accurate in identifying KID-SCID ADHD diagnoses (Area Under Curve = .78). Furthermore, the Academic Problems scale was positively and significantly correlated (r=.34) with the KID-SCID ADHD diagnosis, suggesting that this scale is sufficient in capturing ADHD symptoms.

Given that the Attention-Deficit/Hyperactivity Disorder (ADH) subscale from the APS and the Academic Problems subscale (ADP) from the APS-SF have similar item content and are thought to capture the same underlying construct, both subscales were used for this study to measure ADHD symptoms (e.g., I was distracted a lot in school or work). The Oppositional Defiant Disorder (OPD) and Conduct Disorder (CND) subscales from the APS and APS-SF were used for this study as covariates to measure ODD (e.g., I argued with my teachers or parents) and CD (e.g., I broke into a house, car, or building) symptoms.

**Behavioral Measures**

*Behavioral write-ups.* Behavioral write-ups for rule violations that included descriptions of the behaviors that prompted each write-up were issued by trained staff at the residential facility. These violations varied in severity from minor rule violations (e.g., calling staff names, excessive noise/yelling) to major rule violations (e.g., hitting/kicking/biting staff or peer, destroying state property), with the most major rule violations resulting in separation from other juvenile offenders through placement in the
controlled behavior unit (CBU). Descriptions of rule-violating behaviors were then entered into a database by administrative staff, and trained research assistants were given access to this information by means of a de-identified version of the same database. Based on a categorization framework developed by the research team, research assistants coded these behaviors across twelve behavioral categories (see Table 1). An estimate of inter-rater reliability was calculated across raters and was determined to be good (kappa = .92). For the purpose of this study, overall rule violating behaviors and rule violations according to specific behavioral categories were used as outcome measures. Aggression was operationalized by the total number of rule violations documented by facility staff within the first month of youths’ arrival across four behavior categories (i.e., physical aggression, verbal aggression, destructive behavior, and threatening behavior) that best capture the construct of aggression according to the research literature (e.g., Dodge, Price, Bachorowski, & Newman, 1990; Geen, 1990; Vachon, Lynam, & Johnson, 2014). Additionally, aggression toward people (i.e., physical aggression and threatening behaviors) was also used as an outcome measure, as this category reflected a higher level of severity. Intercorrelations between categories of rule violating behaviors were performed to determine if the present study’s operationalization of aggression was conceptually accurate. As expected, all behavior categories for aggression were significantly correlated ($r’$s=.417-.947). Intercorrelations between behavior categories are presented in Table 2.
Table 1 *Rule-violating classifications.*

<table>
<thead>
<tr>
<th>Overall Rule Violations</th>
<th>Overall Aggression</th>
<th>Aggression Toward Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Disruptive Behavior</strong> (e.g., excessive talking/yelling)</td>
<td>• <strong>Destructive Behavior</strong> (e.g., damage to property, throwing objects)</td>
<td>• <strong>Physical Aggression</strong> (e.g., hitting/kicking/biting staff or peer)</td>
</tr>
<tr>
<td>• <strong>Disrespectful Behavior</strong> (e.g., calling staff names, touching staff in nonaggressive manner)</td>
<td>• <strong>Verbal Aggression</strong> (e.g., gross profanity directed to staff/peers, arguing with staff/peers)</td>
<td>• <strong>Threatening Behavior</strong> (e.g., getting in/yelling in staffs’ face, threatening staff/peers)</td>
</tr>
<tr>
<td>• <strong>Destructive Behavior</strong> (e.g., damage to property, throwing objects)</td>
<td>• <strong>Physical Aggression</strong> (e.g., hitting/kicking/biting staff or peer)</td>
<td></td>
</tr>
<tr>
<td>• <strong>Verbal Aggression</strong> (e.g., gross profanity directed to staff/peers, arguing with staff/peers)</td>
<td>• <strong>Threatening Behavior</strong> (e.g., getting in/yelling in staffs’ face, threatening staff/peers)</td>
<td></td>
</tr>
<tr>
<td>• <strong>Physical Aggression</strong> (e.g., hitting/kicking/biting staff or peer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Threatening Behavior</strong> (e.g., getting in/yelling in staffs’ face, threatening staff/peers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Noncompliance</strong> (e.g., not following program rules, refusing assignment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Sexual Behavior</strong> (e.g., indecent exposure, sexual gestures)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Self-Harm</strong> (e.g., banging head, scratching/hitting/biting self)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Other Rule Violations</strong> (e.g., cheating on a test)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 *Descriptive Statistics and Correlations of Study Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>M(SD)</th>
<th>ADHD</th>
<th>Anger Control</th>
<th>Trait Anger</th>
<th>CD</th>
<th>ODD</th>
<th>Rule Violations</th>
<th>Total Aggression</th>
<th>Toward Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD Symptoms</td>
<td>52.74(10.34)</td>
<td>- .068</td>
<td>.090</td>
<td>.430**</td>
<td>.693**</td>
<td>.194*</td>
<td>.189*</td>
<td>.174</td>
<td></td>
</tr>
<tr>
<td>Anger Control</td>
<td>11.02(2.64)</td>
<td>- .074</td>
<td>-.081</td>
<td>-.138</td>
<td>-.013</td>
<td>.014</td>
<td>.098</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait Anger</td>
<td>18.11(4.60)</td>
<td>.011</td>
<td>.239**</td>
<td>.200*</td>
<td>.087</td>
<td>.037</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD Symptoms</td>
<td>59.39(12.22)</td>
<td>.597**</td>
<td>.056</td>
<td>.074</td>
<td>.097</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODD Symptoms</td>
<td>50.29(9.29)</td>
<td>.166</td>
<td></td>
<td></td>
<td>.164</td>
<td>.173</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Rule Violations</td>
<td>19.54(22.01)</td>
<td></td>
<td></td>
<td></td>
<td>.752**</td>
<td>.417*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Aggression</td>
<td>2.59(3.30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.681**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggression Toward Others</td>
<td>0.68(1.42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* CD = Conduct Disorder Symptoms; ODD= Oppositional Defiant Disorder Symptoms; ADHD = Attention-Deficit/Hyperactivity Disorder Symptoms; Aggression Toward Others = Physical Aggression and Threatening Behaviors.

* p < .05, ** p < .001.
Procedure

Upon arrival to the maximum security residential facility, youths were assigned to a therapist for the purpose of developing a treatment plan and providing services. To allow for youths’ adjustment to the facility, a minimum of two weeks passed prior to the administration of an assessment battery to obtain baseline measures of functioning in order to later evaluate treatment progress. Following this two-week period, self-report measures (e.g., APS or APS-SF to determine treatment needs and STAXI-2 C/A to assess treatment progress) were administered individually by staff employed as mental health professionals. To ensure that youths comprehended directions and understood each item, measures were read verbally, and youths were given the option to ask for clarifications when needed. Of the youths comprising this sample, half were administered the APS, and half were administered the APS-SF depending upon when they were admitted to the facility. Following youths’ discharge from the facility, the research team was given access to a de-identified database of rule violations to code the behaviors described in the behavioral write-ups.
CHAPTER III – RESULTS

**Missing Data**

Missing data for the APS, APS-SF, STAXI-2 C/A, and rule violating behaviors were examined for the youths’ first month in the facility. Only 2.5% of the data from the APS and APS-SF were missing, and only 3.3% of the data from the STAXI-2 C/A were missing, so multiple imputation was not deemed necessary for any of these variables. For behavior data obtained during weeks 1 through 4, 11% of the data were missing for the first week, 12% for the second week, 15% for the third week, and 19% for the fourth week. The increase in missing data across weeks may be explained by the transfer of juvenile offenders to other facilities throughout the course of the study. Little’s MCAR test was performed to test the null hypothesis that the data were missing completely at random. This test yielded non-significant results ($\chi^2 = 94.451, p = .821$), so these data were determined to be missing completely at random and multiple imputation was the method selected to estimate missing values (Pedersen et al., 2017). When imputing missing data, predictive mean matching was utilized because our data deviated from a normal distribution (i.e., overdispersion) and specific rule violating behaviors (e.g., disruptive behavior, disrespectful behavior, verbal aggression) were included simultaneously in the model (Lang & Little, 2016). A total of 20 datasets were imputed considering it has been recommended that 20 imputations are estimated when 10-30% of data are missing (Graham, Olchowski, & Gilreath, 2007).

**Preliminary Analyses**

Descriptive analyses (See Table 2) were performed to ensure that no assumptions of the planned statistical tests were violated (e.g., independence of observations,
nonnegative count variables, overdispersion) and that all independent variables were within range of the expected values. Data were also screened for skewness and kurtosis as well as outliers to identify extreme data points. Symptoms of CD, ODD, and ADHD from the APS and APS-SF were positively skewed and two outliers were identified, which were replaced through winsorization (replacing the top 5% and bottom 5% data points with the nearest maximum and minimum values that are not considered outliers), resolving the skewness of these predictor variables. Frequencies of the outcome variables (i.e., overall rule violations, aggressive behaviors, and aggression toward others) at each week are provided in Table 3.

Table 3 *Frequencies of Rule Violations*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Rule Violations</td>
<td>539</td>
<td>522</td>
<td>510</td>
<td>748</td>
</tr>
<tr>
<td>Total Aggression</td>
<td>80</td>
<td>64</td>
<td>72</td>
<td>90</td>
</tr>
<tr>
<td>Aggression Toward Others</td>
<td>10</td>
<td>20</td>
<td>27</td>
<td>22</td>
</tr>
</tbody>
</table>

*Intercorrelations Between Predictor Variables and Covariates*

Bivariate correlations were run to determine if the predictor and outcome variables were related to each other as expected and which variables should be retained as covariates. There were positive correlations between ADHD symptoms and overall rule violations \((r=.19, p=.03)\) and aggression; a composite score of physical aggression, verbal aggression, disruptive behaviors, and threatening behaviors \((r=.18, p=.04)\). Additionally, a positive correlation was found between trait anger and overall rule violations \((r=.20,\)
As expected, there was a positive correlation between CD and ODD symptoms ($r=.597, p<.001$) from the APS; however, surprisingly, these symptoms were not significantly correlated with any of the outcome variables (i.e., overall rule violations, overall aggression, or aggression toward others). When CD and ODD symptoms were correlated with specific rule violations, significant associations were found for between some variables (e.g., disruptive behavior, disrespectful behavior, verbal aggression and ODD and CD symptoms), albeit these correlations were small in magnitude. Both CD and ADHD symptoms ($r=.430, p<.001$) and ODD and ADHD symptoms ($r=.693, p<.001$) were positively correlated. ODD symptoms and trait anger were also positively correlated ($r=.239, p=.010$). Given that the subscales of the APS were significantly correlated, and trait anger was significantly correlated with overall rule violations, CD symptoms, ODD symptoms, and trait anger subscales were included in the regression analyses as covariates. Correlations between predictor variables, covariates, and dependent variables are presented in Table 2.

**Data Analytic Strategy for Main Analyses**

The outcome variables (i.e., overall rule violating behaviors and aggressive behaviors) are count data and contain a high percentage of zeros. Because traditional linear regression models require that the residual errors follow a normal distribution, this method would not have been appropriate to test this study’s hypotheses. Beaujean and Morgan (2016) suggest the use of poisson regression or negative binomial regression for these types of data. Poisson regression analyses require for the variance and mean to be similar, whereas negative binomial regression analyses are equipped to analyze data when the variance is larger than the mean. A one-sample Kolmogorov-Smirnov test
indicated that the rule violating behavior data did not follow a poisson distribution, $K$-S $Z = 4.783, n = 103, p < 0.001$, so it was determined that these data most closely followed the negative binomial probability distribution. Results of our negative binomial regression analyses include the reporting of the exponentiated regression coefficient, $\text{Exp}(\beta)$, or incidence-rate ratios (IRR; the mean ratio of the outcome), which will assist in interpreting the relationship between the independent and dependent variables. The IRR represents a 1-unit change in the predictor variable which corresponds to a multiplicative effect for the outcome variable (Anestis, Gottfried, & Joiner, 2014).

A series of negative binomial regression analyses were conducted to test the hypothesis that ADHD symptoms and anger control are predictive of rule violating behaviors. Rule violating behaviors were collapsed across the following categories: overall rule violations, overall aggressive behaviors (i.e., physical aggression, verbal aggression, threatening behaviors, destructive behaviors), and aggressive behaviors toward others (i.e., physical aggression and threatening behaviors). For these models, ADHD symptoms and anger control were entered as predictors; overall rule violations, overall aggressive behaviors, or aggressive behaviors toward others were entered as outcome variables; and CD symptoms, ODD symptoms, and trait anger were included as covariates. In addition, a series of negative binomial regression analyses were conducted to test the hypothesis that anger control moderated the relationship between ADHD symptoms and rule violating/aggressive behaviors. In these regression models, anger control and ADHD symptoms were centered and multiplied together to create an interaction term, which was entered as a predictor variable along with anger control, ADHD symptoms, and the covariates. Considering that some youths responded to the
APS/APS-SF in an overly defensive (N=8) or inconsistent (N=4) manner, analyses were run with and without the inclusion of these youths. Since there was no difference in the results when these youths were removed from the analyses, the findings were reported with their inclusion. These data were also analyzed for youths whose committing offense included a probation violation (N= 45), and the results did not change.

**Main Study Analyses**

Results of the direct effects regression models revealed that ADHD significantly predicted overall rule violations, B(SE) = .031(.014), IRR = 1.03, 95% CI = .002-.059, \(p=.038\), but did not predict overall aggressive behaviors (B(SE) = .028(.018), IRR = 1.02, 95% CI =-.009-.064, \(p=.139\)) or aggression toward others (B(SE) = .022(.026), IRR = 1.02, 95% CI =-.029-.074, \(p=.394\)). For every one-point increase in ADHD symptoms, 1.03 times more rule violations were committed. Additionally, trait anger significantly predicted overall rule violations, B(SE) = .079(.026), IRR = 1.08, 95% CI = .028-.131, \(p=.002\); For every one-point increase in trait anger scores, 1.08 times more rule violations were committed. The remaining covariates did not predict overall rule violations (ODD symptoms: B(SE) = .004(.019), IRR = .98, 95% CI=-.039-.012, \(p=0.83\); CD symptoms: B(SE) = -.014(.013), IRR = 1.00, 95% CI =-.035-.043, \(p=0.28\), overall aggressive behaviors (ODD symptoms: B(SE) = .010(.023), IRR = 1.01, 95% CI =-.036-.056, \(p=.669\); CD symptoms: B(SE) = -.007(.016), IRR = 0.99, 95% CI = -.040-.025, \(p=.139\), or aggression toward others (ODD symptoms: B(SE) = .043(.035), IRR = 1.04, 95% CI =-.026-.112, \(p=.221\); CD symptoms: B(SE) = -.004(.022), IRR = 0.99, 95% CI =-.048-.040, \(p=.856\)). Results for these analyses are presented in Table 4. Results of the moderation regression models revealed that the interaction term comprised of anger
control and ADHD symptoms was not a significant predictor for overall rule violating behaviors ($B(SE) = .001(.003)$, $IRR = 1.00$, 95% CI = -.006-.008, $p=.870$), overall aggression ($B(SE) = .002(.005)$, $IRR = 1.00$, 95% CI = -.008-.012, $p=.687$), or aggression toward others ($B(SE) = .007(.008)$, $IRR = 1.00$, 95% CI = -.009-.023, $p=.371$). Results of these analyses are presented in Table 5. On an exploratory basis, we examined whether our findings remained the same when aggressive behaviors were excluded from the all rule violations composite variable to determine whether disruptive behaviors and not aggressive behaviors were driving these significant effects. Interestingly, both ADHD symptoms ($B(SE) = .031(.014)$, $IRR = 1.03$, 95% CI = .002-.059, $p=.034$) and trait anger ($B(SE) = .085(.026)$, $IRR = 1.08$, 95% CI = .033-.136, $p=.001$) continued to be significant predictors and the interaction term in the moderation model remained insignificant.
Table 4 Direct Effects Regression Models

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total Rule Violations</th>
<th>Total Aggression</th>
<th>Aggression Toward Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
<td>IRR</td>
</tr>
<tr>
<td>ADHD</td>
<td>.031</td>
<td>.014</td>
<td>1.03*</td>
</tr>
<tr>
<td>Anger Control</td>
<td>.014</td>
<td>.039</td>
<td>1.01</td>
</tr>
<tr>
<td>Trait Anger</td>
<td>.079</td>
<td>.026</td>
<td>1.08*</td>
</tr>
<tr>
<td>CD</td>
<td>-.012</td>
<td>.013</td>
<td>0.98</td>
</tr>
<tr>
<td>ODD</td>
<td>.002</td>
<td>.020</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .001
Table 5 *Moderation Regression Models*

<table>
<thead>
<tr>
<th>Variables</th>
<th>β</th>
<th>SE</th>
<th>IRR</th>
<th>95% CI</th>
<th>β</th>
<th>SE</th>
<th>IRR</th>
<th>95% CI</th>
<th>β</th>
<th>SE</th>
<th>IRR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD*AC</td>
<td>.001</td>
<td>.003</td>
<td>1.00</td>
<td>-.006-.008</td>
<td>.002</td>
<td>.005</td>
<td>1.00</td>
<td>-.008-.012</td>
<td>.007</td>
<td>.008</td>
<td>1.00</td>
<td>-.009-.023</td>
</tr>
<tr>
<td>ADHD</td>
<td>.031</td>
<td>.015</td>
<td>1.03*</td>
<td>.001-.061</td>
<td>.029</td>
<td>.018</td>
<td>1.02</td>
<td>-.008-.066</td>
<td>.025</td>
<td>.026</td>
<td>1.02</td>
<td>-.027-.077</td>
</tr>
<tr>
<td>Anger Control</td>
<td>.014</td>
<td>.040</td>
<td>1.01</td>
<td>-.064-.093</td>
<td>.017</td>
<td>.054</td>
<td>1.01</td>
<td>-.089-.123</td>
<td>.123</td>
<td>.079</td>
<td>1.13</td>
<td>-.033-.280</td>
</tr>
<tr>
<td>Trait Anger</td>
<td>.079</td>
<td>.026</td>
<td>1.08*</td>
<td>.027-.130</td>
<td>.036</td>
<td>.031</td>
<td>1.03</td>
<td>-.025-.098</td>
<td>.002</td>
<td>.047</td>
<td>1.00</td>
<td>-.090-.095</td>
</tr>
<tr>
<td>CD</td>
<td>-.012</td>
<td>.013</td>
<td>0.98</td>
<td>-.037-.014</td>
<td>-.006</td>
<td>.016</td>
<td>0.99</td>
<td>-.039-.026</td>
<td>-.001</td>
<td>.023</td>
<td>0.99</td>
<td>-.046-.045</td>
</tr>
<tr>
<td>ODD</td>
<td>.002</td>
<td>.020</td>
<td>1.00</td>
<td>-.038-.042</td>
<td>.009</td>
<td>.023</td>
<td>1.00</td>
<td>-.038-.055</td>
<td>.038</td>
<td>.035</td>
<td>1.03</td>
<td>-.032-.108</td>
</tr>
</tbody>
</table>

*Note. B(SE) = Coefficient (standard error) for predicting the dependent variable from each independent variable; IRR = Incident rate ratio; 95% CI = 95% Confidence interval for each IRR; ADHD*AC = Interaction term (ADHD and anger control).*

* p < .05, ** p < .001
CHAPTER IV – DISCUSSION

The present study aimed to explore the relationship between ADHD symptoms, anger control, and subsequent institutional aggression. This study also sought to examine whether anger control would strengthen the relationship between ADHD symptoms and rule violating behaviors among JOs upon their initial admission to a maximum security residential facility. Although research has investigated these variable separately, it is unclear if and how they interact in a high-risk sample of juvenile offenders. Research in this area is more robust for adult offenders; however, it is not appropriate to generalize findings from studies involving adult offenders to JOs considering these youths are often opportunistic in criminality (Richards, 2011) and do not tend to recidivate once they reach adulthood (Moffitt, 2017). Understanding whether poor behavioral and emotional self-regulation predict maladaptive behaviors within institutional settings is essential, as it may provide important information regarding the development of prevention and treatment efforts (Roberton et al., 2015).

As expected, elevated ADHD symptoms were associated with increased rule violations, and these results remained while taking into account ODD and CD symptoms. This finding is consistent with the extant literature suggesting that youths with ADHD are more likely to engage in institutional aggression (Cornell et al., 1999; Young & Thome, 2011) and conduct/behavioral problems (Young et al., 2011). Although previous research has found that aggression may be driven by co-occurring diagnoses of disruptive behavior disorders (i.e., ODD and CD; Harty et al., 2009), the results of this study suggest that ADHD symptoms is a potential risk factor for a variety of rule violating behaviors including disruptive behaviors and noncompliance. Past studies have found
that children (Factor, Rosen, & Reyes, 2016; Kieling & Rohde, 2010) and adolescents (Evans, Sibley, & Serpell, 2009) with ADHD struggle with noncompliance and have higher levels of disruptive behaviors than those without ADHD. Therefore, it is not surprising that ADHD symptoms predicted rule violations among these youths. The low base rates of aggressive behaviors (M=2.59) and aggression toward others (M=0.68) compared to overall rule violations (M=19.54) may provide an explanation as to why ADHD symptoms did not predict outcomes specific to aggression.

Considering that an inability to adaptively regulate anger has been found to decrease the likelihood of inhibiting aggressive responses (Denson, DeWall, & Finkel, 2012), an association between poor anger control and increased aggression was anticipated. Contrary to our prediction, a significant relationship between these variables was not found. Relatedly, another major goal of this study was to examine whether anger control moderated the relationship between ADHD symptoms and rule violating behaviors (i.e., total rule violations, total aggression, and aggression toward others). It was anticipated that the relationship between elevated ADHD symptoms and rule violating behaviors would be stronger for those youths with poor anger control. Such a prediction was made considering youths with ADHD often experience more intense feelings of anger (Wheeler & Carlson, 2000) and struggle with the regulation of negative emotionality (Shaw et al., 2014; Sjöwall et al., 2013) as compared to youths without ADHD. Surprisingly, the results of this study did not support this hypothesis in a sample of JOs. This lack of significant findings may be explained by how we measured anger control (i.e., Anger Control subscale of STAXI-2 C/A). The Anger Control subscale of the STAXI-2 C/A contains items that mostly pertain to coping with anger through relaxation (e.g., I do
something to relax and calm down). Relaxation is not necessarily always the best strategy for controlling anger, and because it is only one method of coping, it may not work under all circumstances. Further, the remaining items did not capture what emotion regulation strategies were actually used to achieve the desired outcome of controlling anger (e.g., I try to relax), thus it is unclear whether these strategies were adaptive or maladaptive.

Obtaining more information regarding the specific forms of coping strategies used to regulate anger may clarify in what instances emotion regulation impacts the relationship between ADHD symptoms and rule violating behaviors. It is also possible that this relationship may have been found if our measure of anger control had taken the expression of anger into account considering that adaptive emotion regulation depends on one’s capability to control their behavior rather than the negative feelings themselves (Gratz & Tull, 2010). Another explanation is that youths perceived their anger coping strategies as effective, although in reality, these strategies may not have been used consistently or optimally. Youths may also have poor insight into their ability to inhibit their outward expressions of anger. Finally, they may have attempted to portray themselves in a positive light to lessen the amount of therapeutic services they receive while in the facility; however, given that the majority of responses on the APS/APS-SF were deemed valid and devoid of response bias, this possibility is not as likely.

Although anger control was not associated with aggression, trait anger was a significant predictor of rule violating behaviors. This finding is consistent with previous research showing a link between trait anger and reactive or impulsive aggression (i.e., following provocation; Bettencourt, Talley, Benjamin, & Valentine, 2006; Ramirez & Andreu, 2006). Viewing one’s environment as hostile (i.e., hostile attribution bias) and a lack of
effortful control have been proposed and supported as mediators in the relationship between anger and aggression (White & Turner, 2014; Wilkowski & Robinson, 2008). Furthermore, trait anger has been found to be associated with a variety of other maladaptive outcomes (Wilkowski & Robinson, 2008). Specifically, children with high levels of anger are more prone to having conduct problems later in life (Arsenio, Cooperman, & Lover, 2000), and adults with antisocial personality traits and a history of childhood conduct disorder have been found to have elevated trait anger (Perdikouri, Rathbone, Huband, & Duggan, 2007). Thus, trait anger is not only a risk factor of aggression, but increases the likelihood of other rule violating behaviors as well.

**Limitations, Clinical Implications, and Future Directions**

Importantly, this study is the only known study to examine the associations between ADHD symptoms, anger control, and rule violating behaviors within a sample of juvenile offenders. The moderating role of anger control in the relationship between ADHD symptoms and rule violations was also investigated for the first time in this specialized population. Further, this study used a more ecologically valid measure of rule violating behaviors by using behavioral write-ups by staff instead of relying on self-report measures. Our results expanded upon previous research (e.g., Arsenio et al., 2000; Duran-Bonavila et al., 2017) by establishing a link between ADHD symptoms and trait anger with rule violating behaviors over and above ODD and CD symptoms among juvenile offenders.

Despite these strengths, this study is not without its limitations. First, the results of this study would be strengthened with the inclusion of measures specific to impulsivity. The APS/APS-SF was used to assess if clinically significant symptoms of
specific psychological disorders (e.g., ADHD, ODD, CD) were present, but these data were not available at the item-level. Therefore, a composite score inclusive of impulsive symptoms only could not be examined as a unique predictor of rule violating and aggressive behaviors. Second, anger control (Anger Control subscale of the STAXI-2 C/A) was assessed as one’s perceived ability to control the outward expression of anger and the regulation of anger through calming techniques. Considering both adaptive and maladaptive regulation strategies were likely used by the youths in this sample, it is possible that youths may have engaged in adaptive coping strategies in some instances but maladaptive coping strategies in other instances. Therefore, it is necessary to further distinguish between these coping techniques, which could potentially be captured with other scales on the STAXI-2 C/A (e.g., Anger Expression-In) or other measures assessing the use of specific emotion regulation strategies (e.g., Cognitive Emotion Regulation Questionnaire; Garnefski et al., 2001). Third, these data only consist of male juvenile offenders, which limits the generalizability of the results to females. Past research suggests that females with ADHD may exhibit a different symptom presentation than males, such that they engage in less disruptive, externalizing behaviors (Gershon, 2002), implying that the significant relationships found in the present study may not be replicated in a sample of female JOs. Finally, despite the strengths of how rule violating behaviors were operationalized, it is possible that some behaviors may have been missed in less supervised settings since rule violating behaviors reflect behaviors that were actually observed and recorded by staff. Further, certain behaviors may not have been recorded as a function of staff not wanting to complete additional paperwork.
The findings of the present study highlight the need for future research to replicate our findings and identify other variables that play a contributory role in the occurrence of rule violations within institutional settings. Replication studies examining our study variables in other maximum security residential facilities may be warranted, as these findings may not be applicable to JOs across different geographical locations. It may also be of interest to replicate these results across non-profit and for-profit facilities. A recent report by In the Public Interest (ITPI, 2016) found that aggressive behaviors occur more often in private prisons compared to public prisons and it is important to understand what risk factors account for this difference across institutional settings, which may be a result of these prison systems being understaffed. Future studies should also evaluate variables that could potentially moderate (e.g., trait anger; Bettencourt et al., 2006) or mediate (e.g., emotional awareness; Donahue, Goranson, McClure, & Van Male, 2014) the relationship between ADHD symptoms and rule violating behaviors among juvenile offenders. For example, it may be worthwhile to examine trait anger as a moderator since youths with chronically high levels of anger are less likely to consistently use adaptive emotion regulation strategies and are at greater risk for aggression and related behaviors (Wilkowski & Robinson, 2010). It would also be interesting to examine whether maladaptive coping strategies (e.g., rumination, suppression) in addition to the absence of adaptive coping strategies moderates the relationship between ADHD symptoms and rule violating behaviors. In addition, both difficulties with emotional awareness (i.e., recognizing and acknowledging one’s emotions) and impulsivity may explain the relationship between negative emotionality and aggressive behaviors, particularly in males (Donahue et al., 2014). Thus, it is
plausible that emotional awareness could also serve as a mediator between ADHD symptoms characterized by impulsivity and rule violating behaviors, including aggression. It is important to take potential mediators of these variables into consideration, as interventions targeting enhancing emotional awareness may be beneficial in preventing and reducing undesirable behaviors.

Our findings have important clinical implications that deserve some attention. Since trait anger and ADHD symptoms were found to be risk factors of rule violating behaviors in our sample of JOs, treatment may focus on reducing youths’ persistent feelings of anger (Deffenbacher, Dahlen, Lynch, Morris, & Gowensmith, 2000) and preventing impulsive behaviors, particularly in response to anger-provoking situations. For instance, teaching youths how to mindfully recognize feelings of anger through physiological signs (e.g., flushing of the face), to consider potential consequences of responding to the anger-provoking situation in different ways, and perspective-taking may allow youths to rationally consider their options before acting on impulses. Providing youths psychoeducation on how to think logically rather than allowing their thoughts and behaviors to be controlled by their emotions may also promote the objective evaluation of possible choices that can help them reach their goals in the most effective manner. Furthermore, given that some coping strategies are considered to be maladaptive (e.g., blaming others, rumination, reduced positive reappraisal; Martin & Dahlen, 2005), it may also be beneficial to explore these maladaptive emotion regulation strategies individually and provide JOs psychoeducation to aid in replacing those with more adaptive coping strategies (e.g., relaxation, positive refocusing, perspective taking; Garnefski, Kraaij, & Spinhoven, 2001). For example, emotion regulation strategies (e.g.,
opposite action, checking the facts, coping ahead) derived from dialectical behavior therapy (DBT) may prove advantageous, as this evidence-based treatment is often not employed in juvenile correctional facilities (Swank & Gagnon, 2016) despite growing support of its use within these populations (e.g., Shelton, Kesten, Zhang, & Trestman, 2011). Finally, it may be appropriate to provide psychoeducation regarding psychopathology (e.g., symptoms of ADHD) to staff employed at juvenile correctional facilities. This information may aid staff in distinguishing between impulsive behaviors and premeditated behaviors, which may play an important role in how staff determine the most appropriate method of responding to infractions.

Developing a more thorough understanding of the factors that predict rule violating behaviors in JOs serves as an initial step toward refining intervention efforts. The results of the present study support the notion that deficits in behavioral regulation predict rule violating behaviors. However, more work needs to be done to determine if a lack of adaptive coping strategies or the presence of maladaptive coping strategies strengthens the relationship between ADHD symptoms and rule violating behaviors. Given that youths with ADHD are at a heightened risk of becoming involved with the juvenile justice system (Aguilar-Cárceles & Farrington, 2017), these individuals may require some adaptations or additions to current treatment practices. Cognitive-behavioral therapy (CBT) is an evidence-based treatment for anger and aggression, which includes teaching youths how to regulate negative emotionality, engage in problem-solving, and act assertively (Sukhodolsky, Smith, McCauley, Ibrahim, & Piasecka, 2016). In addition to learning these skills, it could be helpful to provide psychoeducation regarding the differences between adaptive and maladaptive forms of anger regulation. Moreover,
although it is unclear whether poor anger control contributes to rule violating behaviors, ADHD symptoms (i.e., impulsivity) seem to predict these negative outcomes. Thus, deficits in behavioral regulation should also be targeted in treatment. More research must be done to determine what variables most strongly predict rule violating behaviors among JOs and what factors strengthen the relationships between these variables. Once these variables are identified, interventions could become more refined by including elements that specifically target risk factors most relevant to this specialized population, thus optimizing treatment effectiveness.
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NOTICE OF COMMITTEE ACTION
The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately, but not later than 10 days following the event. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER: IRB-18-13
PROJECT TITLE: Elevated ADHD Symptomatology and Poor Anger Control as Predictors of Aggression Among Male Juvenile Offenders
SCHOOL/PROGRAM: School of Psychology, Psychology
RESEARCHER(S): Kathleen Ramsey
                      Stephanie Smith
IRB COMMITTEE ACTION: Approved
CATEGORY: Exempt
PERIOD OF APPROVAL: October 24, 2018 - October 24, 2019
Edward L. Goshorn, Ph.D.
Institutional Review Board Chairperson
REFERENCES


In the Public Interest. “How private prison companies increase recidivism.” 2016.


