

**Correlates of  
Change in Adolescent Psychopathic Traits**

by

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## Abstract

Modeled after conceptualizations of adult psychopathy, adolescent psychopathy has been defined as a serious personality disorder characterized by a distinctive constellation of interpersonal, affective, and behavioral traits (Cooke & Michie, 2001; Forth, Kosson, & Hare, 2003; Lee et al., 2010; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). Most importantly, prior research indicates that, although adolescent psychopathy shares a similar nomological net with adult psychopathy, there are important developmental differences. These developmental differences underscore the continuing debate framed by important ethical and developmental concerns regarding the assessment of psychopathic traits in youth. A critical developmental concern relates to the levels of continuity and change in psychopathic traits during the adolescent. Moreover, while adult psychopathy demonstrates a theoretically meaningful pattern of convergent and divergent relations with the psychopathological domains of externalizing and internalizing symptomatology, adolescent psychopathy typically differs from this pattern; namely, greater levels of comorbidity across both psychological domains and divergent relationships at the dimensional level. Research examining the potential change in adolescent psychopathic traits during the adolescent period and how comorbid psychopathology may influence the direction of this change has important implications for understanding the developmental trajectory of the disorder and informing intervention strategies.

This study examined both the change in psychopathic traits and the correlates of change in a sample of 90 male adolescent offenders adjudicated for committing a sex offense. Mean differences were observed in PCL:YV total scores and scores across all four latent psychopathy dimensions; however, significant mean reductions were observed between administrations for all scores except antisocial scores. Hierarchical multiple regression analyses via the regressor

variable method were used to model the change in psychopathy scores and to examine the correlates of such change. Not surprisingly, pretest scores accounted for a significant proportion of the posttest variance in PCL:YV total and factor scores. The regressions indicated that, after controlling for pretest scores, only internalizing symptoms (depressive-trauma symptom presence) and the assessment interval accounted for significant change in PCL:YV scores across treatment. Depressive-trauma symptom presence was associated with a decrease in PCL:YV total scores and interpersonal scores across treatment. Longer assessment intervals were associated with an increase in interpersonal scores across treatment. Contrary to prior research, externalizing symptom presence did not predict an increase in PCL:YV scores. Directions for future research and the importance of further studies regarding the change in adolescent psychopathic traits and the correlates of such change are discussed.

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## List of Abbreviations

ABSOP	Accountability Based Juvenile Sexual Offender Assessment Treatment Program
ADHD	Attention-Deficit/Hyperactivity Disorder
APS	Adolescent Psychopathy Scale
APD	Antisocial Personality Disorder
APSD	Antisocial Process Screening Device
CU	Callous Unemotional
CPS	Childhood Psychopathy Scale
CD	Conduct Disorder
DYS	Department of Youth Services
GAD	Generalized Anxiety Disorder
IC	Interpersonal Callousness
ICCs	Intraclass Correlations Coefficients
K-SADS-PL	The Schedule for Affective Disorders and Schizophrenia for School-Age Children- Present and Lifetime Version
ODD	Oppositional Defiant Disorder
EFA	Exploratory Factor Analysis
PCL-R	Psychopathy Checklist-Revised
PCL-SV	Psychopathy Checklist-Screening Version
PCL:YV	Psychopathy Checklist: Youth Version

PTSD      Post-Traumatic Stress Disorder

SAD      Separation Anxiety Disorder

## **Introduction**

Psychopathy is a serious personality disorder that is characterized by a distinctive constellation of interpersonal (e.g., manipulativeness, egocentricity), affective (e.g., callousness, lack of remorse or guilt), and behavioral (e.g., irresponsibility, antisociality) characteristics (Cooke & Michie, 2001; Forth, Kosson, & Hare, 2003; Lee et al., 2010; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). Like most adult personality disorders, it is thought to first appear earlier in life and persist throughout the lifespan (Forth & Burke, 1998). Within forensic settings, extensive research indicates that adult psychopathy is a powerful and meaningful construct demonstrating a well-established nomological net, conceptual coherence, and predictive utility (Hart, Watt, & Vincent, 2002; Seagrave & Grisso, 2002). Fueled, in part, by the extensive empirical support for the predictive utility of adult psychopathy, a growing body of research has begun to explore the manifestation of psychopathic traits in youth.

### **The Nomological Net of Adolescent Psychopathy**

Emerging literature suggests that although adolescent psychopathy shares a similar nomological net with adult psychopathy, there are important developmental differences. Adolescent psychopathy has been associated with certain cognitive and affective processes similar to adult psychopathy (Salekin, Neumann, Leistico, & Zalot, 2004): behavioral inhibition (Vitale et al., 2005), personality patterns (Salekin, Leistico, Trobst, Schrum, & Lochman, 2005), and certain psychopathology such as conduct disorder (CD) and oppositional defiant disorder (ODD) (Salekin, Neumann, Leistico, DiCicco, & Duros, 2004). Despite these similarities, important developmental differences have been found, including higher than expected levels o

internalizing symptoms such as anxiety (Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002; Kubak & Salekin, 2009) and divergent results on performance task studies (Salekin, 2006). These recognized developmental differences provide a context for the ongoing debate over the downward extension of psychopathy to children and adolescents.

### **Debate Over the Downward Extension**

Developers of measures of psychopathic traits in youth (Frick, 2002; Lynam, 2002) as well as critics of the downward extension (Edens, Skeem, Cruise, & Cauffman, 2001; Seagrave & Grisso, 2002) have highlighted the ethical and developmental concerns regarding the assessment of psychopathic traits in youth. Ethical concerns primarily focus on the potentially grave consequences of labeling a youth as psychopathic (see Edens, et al., 2001; Farrington, 2005; Rutter, 2005), which include more severe sentencing in forensic settings (Edens, Guy, & Fernandez, 2003; Petrila & Skeem, 2003) and more negative juror perception of risk and decisions regarding punishment (Boccaccini, Murrie, Clark, & Cornell, 2008). Recognizing these concerns, the developers of the child and adolescent psychopathy measures explicitly warn against labeling youth as psychopathic (Forth et al., 2003; Frick & Hare, 2001).

In addition to serious ethical concerns, the assessment of psychopathic traits in youth poses significant developmental challenges (see Salekin & Frick, 2005). One such challenge is the developmental appropriateness of diagnosing the disorder in adolescents when many of the features of psychopathy (e.g., impulsivity, irresponsibility) are reflective of normative and transient developmental characteristics of the adolescent period (Edens et al., 2001; Hart et al., 2002; Seagrave & Grisso, 2002). If these characteristics are normative to this period and unstable, then there is a potential risk that assessment of these traits could lead to the misidentification of psychopathic traits in youth (Edens et al., 2001). A second challenge is whether psychopathic traits are as stable in youth as they are in adults (Hart et al., 2002; Seagrave & Grisso, 2002). This concern derives from the understanding that these traits need to be as stable in childhood and adolescence as they are in adulthood for the construct to be useful,

but ignores the fact that many measures of personality and psychopathology show more modest levels of stability in childhood and adolescence than they do in adulthood (Roberts & DelVecchio, 2000).

One final challenge is that childhood and adolescent disorders exhibit more comorbidity with other forms of psychopathology than do adult disorders (Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Frick, 2002; Lahey, Loeber, Burke, Rathouz, & McBurnett, 2002; Salekin & Frick, 2005), which can pose significant challenges for the assessment and treatment of adolescent disorders. Comorbidity appears to be amplified for adolescents diagnosed with ODD and CD and for clinical and forensic samples (Salekin et al., 2004). Nevertheless, current research has found that child and adolescent psychopathy demonstrates better discriminant validity results than these disorders (Salekin et al., 2004). Additionally, some researchers have argued that this comorbidity may help researchers determine how psychopathy relates to comorbid psychopathology and how these comorbid conditions change over development (Salekin & Frick, 2005). In summary, from a developmental perspective, less stability and higher levels of comorbid psychopathology would be expected when measuring psychopathic traits in youth. Rather than limiting the utility of the construct, these challenges highlight the potential for change in the course of the disorder.

Principles from developmental psychopathology, such as equifinality, multifinality (Cicchetti & Rogosch, 1996; Vitacco & Vincent, 2006), and heterotypic continuity (Vitacco & Vincent, 2006), provide a contextual framework for these developmental concerns as they relate to child and adolescent psychopathy. Two concepts are used to describe the complex pathways to development of disorders in children and adolescents (Cicchetti & Rogosch, 1996; Vitacco & Vincent, 2006). First, equifinality refers to the notion that different pathways can lead to similar outcomes. For example, potential pathways for psychopathy could include genetic predisposition (Viding, Blair, Moffitt, & Plomin, 2004) or environmental factors such as poor parenting or abuse (Marshall & Cooke, 1999). Second, multifinality means that similar pathways can lead to

different outcomes. Thus, an adolescent following the etiological pathway to psychopathy could, alternately, continue to manifest the disorder in adulthood, develop a variety of other forms of psychopathology, or remit and develop into an adult without any psychopathology (Vitacco & Vincent, 2006). Finally, heterotypic continuity refers to developmental changes that affect the expression of psychopathology. Therefore, the way that psychopathic traits are expressed in adolescents may differ greatly from the way they are expressed in adults. These principles are critical to understanding the development of psychopathy – in particular, those developmental differences that have been found in the manifestation of psychopathic traits in youth as compared to adults.

### **Assessment of Psychopathic Traits in Youth**

**Adolescent psychopathy measures.** The research regarding psychopathy in youth has required the construction of developmentally appropriate measures that can reliably assess these traits. Research with many of these measures has shown that they demonstrate similar structural homogeneity, interrater agreement, and similarity in item functioning and factor structure to adult measures of psychopathy (Frick, Bodin, & Barry, 2000; Salekin, Brannen, Zalot, Leistico, & Neumann, 2006; Vincent & Hart, 2002). One of the most comprehensive and widely-used measures to assess psychopathic traits in youth is the Psychopathy Checklist—Youth Version (PCL–YV; Forth, Kosson, & Hare, 2003), a downward extension of the Psychopathy Checklist—Revised (PCL-R; Hare, 1991, 2003). The PCL-R is viewed, by some, as “the gold standard” measure of psychopathy in adult forensic populations, demonstrating considerable reliability and construct validity (Spain, Douglas, Poythress, & Epstein, 2004). In contrast, others have argued that the field has wrongly and prematurely confused the PCL-R with the Cleckleyan conceptualization of the psychopathy construct emphasizing primarily “core” features of psychopathy (i.e., the interpersonal, affective, and behavioral features of the disorder) (see Skeem and Cooke (2010a) and Skeem and Cooke (2010b) for a discussion of the problems associated with equating the PCL-R with the psychopathy construct).

**Dimensions of psychopathy in youth.** Psychopathy has traditionally been conceptualized as a unitary construct operationalized by total scores on one or more assessment measures (Patrick, Poythress, Edens, Lilienfeld, & Benning, 2006). However, researchers have increasingly begun to analyze psychopathy as a multidimensional construct. Researchers believe that this type of analysis may yield important clinical insight into the disorder such as the differential relationships the disorder manifests with other criterion variables such as other psychological symptoms (e.g., anxiety, conduct problems) (Patrick et al., 2006). The most widely used model is a two-factor model comprised of Factor 1, the affective-interpersonal factor of psychopathy, defined by core personality features such as superficial charm, grandiosity, manipulation, and shallow affect, and Factor 2, the social deviance factor, reflecting chronic behavioral features of antisociality (e.g., impulsivity and aggression) (Blonigen et al., 2010; Harpur, Hare, & Hakstian, 1989). More recent factor analyses have found acceptable fit for both three-factor (Cooke & Michie, 2001) and four-factor (Hare, 2003; Neumann, Kosson, & Forth, 2006) models, but the four-factor model has been advanced as a less saturated model (Neumann et al., 2006) (see Table 1 for a comparison of the item content of the three models).

### **Change in Adolescent Psychopathic Traits**

As noted earlier, one of the key developmental challenges regarding the construct is the stability of psychopathic traits across the lifespan. Seagrave and Grisso (2002) argued that if psychopathy was to be meaningful in youth, it must demonstrate sufficient temporal stability. This view reflects a classical perspective on personality traits and is based on the notion that personality traits such as psychopathy are biologically based, are not susceptible to environmental influence, and do not change over time (McRae, Jang, Livesley, Riemann, & Angleitner, 2001; Salekin & Frick, 2005). In contrast, a more developmental perspective based on principles of equifinality, multifinality, and heterotypic continuity would predict that, due to the importance of life changes and role transitions, personality traits should be more fluid and prone to change, especially during periods characterized by rapid physical, cognitive,

environmental, and social changes such as adolescence (Lewis, 2001). Notably, even from the classical perspective on personality traits, there are two important qualifications to the general assumption of stability, which indicate that requiring adult levels of trait continuity for an adolescent personality construct to be valid is not realistic. The first is that the degree of stability in personality traits declines somewhat as the retest interval increases (Costa & McCrae, 1992). The second is that stability coefficients are lower in children and generally increase with age (McCrae & Costa, 2003). Although there is still considerable controversy about the age at which peak stability is reached, most researchers agree that personality is fluid until at least age 30 (Costa & McCrae, 1994; Terracciano, McCrae, Brant, & Costa, 2005). Thus, current trends in personality research suggest that trait continuity will be lower for adolescent personality traits.

Before examining the literature regarding continuity and change in personality traits, a discussion of the various ways in which continuity and change are evaluated in relevant contexts is helpful. To ensure the most accurate assessment, personality researchers encourage the consideration of multiple indices of development in personality that provide an overview of continuity and change at both the individual level and the mean or group level. Differential or rank-order continuity reflects the consistency in the relative ordering of individuals in a population on measures of a given trait over time (Caspi, Roberts, & Shiner, 2005) and is typically measured by examining correlations between these traits across two set points in time (Caspi et al., 2005). Change is most often defined in terms of mean-level change (Roberts, Walton, & Viechtbauer, 2006), which refers to change in a particular trait over time and is measured in a given population of individuals over time (within subjects analysis) or at the group level (between subjects analysis) (Caspi et al., 2005). Continuity, at least as defined in terms of rank-order stability, does not preclude the existence of mean-level change over time (Roberts et al., 2006). Another important type of change that is less frequently examined by personality researchers is individual-level change. Individual differences in change refer to the magnitude of increase or decrease exhibited by each individual over the duration of a study on any given trait;

they can be and often are unrelated to population indices of change (Roberts et al., 2001).

Individual-level change is often gauged through the use of difference scores or residual change scores, but due to the lack of reliability in these approaches, researchers are increasingly using the Reliable Change Index (RCI; Jacobson and Truax, 1991) as a measure of individual-level change.

Mean-level change and individual-level change are examined in other contexts, including treatment. A determination of whether change is significant in the treatment context requires consideration of whether such change is not only statistically significant but also clinically meaningful. When examining mean-level change in a treatment context, researchers evaluate the magnitude of such change between a pretest and posttest value (such as an instrument or operationalized outcome variable) using mechanisms such as effect size estimates. Group data may be used to determine an estimate of a clinically meaningful threshold (e.g., certain point decrease on an outcome measure) to determine if a clinically meaningful difference has occurred (e.g., Rogers, Jackson, Sewell, & Johansen, 2004). The RCI has been used extensively to evaluate the clinical significance of individual-level change in therapeutic situations (Jacobson, Roberts, Berns, & McGlinchey, 1999). Thus, research regarding both individual-level and mean-level change simultaneously provides the most balanced overview of the different aspects of change in either a developmental or treatment context. Although this dual examination is quite common in certain treatment contexts where the most important question is often whether a treatment is clinically meaningful at the individual level, the most common indices used to track continuity and change in the developmental literature are rank-order continuity and mean-level change, which limit the understanding of personality development to a population-level phenomenon (Roberts, Caspi, & Moffitt, 2001). Additionally, examining these multiple indices is helpful especially when the time between administrations can be controlled so that the results can be compared within the study and to prior findings. However, this control is sometimes difficult

in many treatment contexts where treatment is mandatory, treatment intervals are variable for each individual, and measures are administered only at intake and upon completion of treatment.

Although research studies directly examining continuity and change in adult psychopathy are limited, those studies have typically found moderate to high levels of continuity. For example, Schroeder, Schroeder, and Hare (1983) found a stability coefficient of .89 in a sample of incarcerated adults, but the follow-up period was 10 months. Rutherford, Cacciola, Alterman, McKay and Cook (1999) examined two-year stability estimates in a sample of 225 substance-dependent adults using PCL-R total score and reported stability estimates of .60 for men and .65 for women. However, Salekin (2006) has argued that these estimates may be more reflective of the stability of drug-related symptoms than of psychopathic traits. In a third study, Blonigen, Hicks, Krueger, Patrick, and Iacono (2006) examined continuity and change in terms of both rank-order stability and mean-level change and found that personality traits related to psychopathy (e.g., fearless dominance and impulsive antisociality) demonstrate both stability and change from late adolescence to early adulthood (17 to 24 years of age) (Blonigen et al., 2006). Their findings suggested distinct development trends for the dimensions of psychopathy with fearless dominance traits (associated with Factor 1, the interpersonal-affective factor of psychopathy) remaining relatively stable from late adolescence to early adulthood, and impulsive antisociality (associated with Factor 2, the social deviance factor of psychopathy) decreasing significantly over this period.

Only a handful of studies have directly examined the continuity and change in adolescent psychopathic traits and only one has examined these traits in adolescents who are engaged in active treatment (Rogers, Jackson, Sewell, and Johansen, 2004). In a recent longitudinal study of 200 community participants, Lynam, Caspi, Moffitt, Loeber, and Stouthamer-Loeber (2007) examined the rank-order stability of psychopathy and found that psychopathy was modestly stable ( $r = .32$ ) from childhood into adulthood when measured using the mother report of the Childhood Psychopathy Scale (CPS; Lynam, 1997) in childhood and using the Psychopathy

Checklist–Screening Version (PCL-SV; Hart, Cox, & Hare, 1995) in adulthood. Using the four-factor model, they also found modest stability across the four psychopathy dimensions with correlations of .17 (interpersonal), .15 (affective), .30 (lifestyle), and .33 (antisocial). Although this study offers some useful insight into the relative stability of psychopathic traits over time, these authors did not examine the stability of scores *during* childhood and adolescence.

In an examination of the stability of psychopathic traits across the developmental period, Lynam, Charnigo, Moffitt, Raine, and Loeber (2009) used linear mixed modeling techniques to examine the individual and mean-level stability of psychopathic traits (measured by the CPS) in a non-referred sample of 1,500 males between the ages of 7 and 18. Stability in total scores was quite high across the sample with average intraclass correlation coefficients (ICCs) ranging from .74, .71, .67, and .56, respectively, across 6-month, 1-year, 2-year, and 5-year periods. Although statistically significant changes were observed in the estimates of mean psychopathy across adolescence, the magnitude of these changes were small while mean-level change over time was quite high. Mean-level change in psychopathy was also examined in a study by Rogers et al. (2004). In a sample of 82 adolescent offenders undergoing treatment for substance use disorders and externalizing disorders, Rogers et al. (2004) examined the mean difference in psychopathy, measured using the Psychopathy-Screen (PS-24) from the Survey of Attitudes and Life Experiences without nontreatment controls (SALE; Rogers, Vitacco, Cruise, Sewell, & Neumann (2002). In this study, a paired-samples *t* test revealed a significant difference between initial and discharge administrations; however, the magnitude of this difference was described as modest.

Additionally, Skeem and Cauffman (2003) assessed the 10-month test-retest reliability of the PCL:YV in a sample of 160 adolescent male offenders and compared their results using the two- and three-factor models. Using the three-factor model, they found moderate test-retest reliability for PCL:YV total scores (.58) and across the three dimensions of the model with correlations ranging from .55 (interpersonal), .44 (affective), to .45 (lifestyle). They found better test-retest reliability using the two-factor model for PCL:YV total scores (.66). In contrast to

results from the three-factor model, they found higher reliability with Factor 2 (.74), which corresponds to the lifestyle dimension of the three-factor model, than with Factor 1 (.51), which corresponds to the interpersonal and affective dimensions of the model. These authors did not examine test-retest reliability using the four-factor model.

Overall, research results are mixed but tend to indicate that adolescent psychopathic traits may be less stable, and consequently more prone to change, during adolescent development. However, study limitations and inconsistent results indicate that more research regarding the potential for change in psychopathic traits during the adolescent period is needed. First, most studies (e.g., Lynam et al., 2007; Lynam et al., 2009) have assessed psychopathy in community and clinic samples. Because psychopathy is increasingly being used as a risk assessment and management tool with delinquent youth, it is important that research be conducted with adolescents in forensic settings. Second, several methodological issues have been identified which limit the generalizability of the current studies to adolescent forensic populations. Aside from the Skeem and Cauffman (2003) study, most studies measured psychopathy using childhood measures such as the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) and the CPS. Examining reliability or stability based on these measures is problematic as these measures capture the behavioral features of psychopathy but may fail to adequately capture the core interpersonal and affective features of psychopathy, in a manner analogous to the PCL:YV (Edens, Hart, Johnson, Johnson, & Olver, 2000; Lee, Vincent, Hart, & Corrado, 2003; Murrie & Cornell, 2002). Similarly, although Skeem and Cauffman (2003) assess psychopathy using the PCL:YV, scores were based on file information only. Additional research, including the semi-structured interview portion as an additional source of information along with collateral file information, is needed to “obtain a proper and richer assessment” of psychopathic personality (Campbell, Porter, & Santor, 2004, p. 43). Third, current research indicates mixed results regarding change at the dimensional level. For example, one study has found more stability across the lifestyle and antisocial dimensions using the four-factor model (Lynam et al., 2007)

and another study has found more stability across the lifestyle and antisocial dimensions using the two-factor model and across the interpersonal dimension using the three-factor model (Skeem & Cauffman, 2003). Fourth, most studies have only examined rank-order stability or test-retest reliability of psychopathy measures. Only the Lynam et al. (2009) and Rogers et al. (2004) studies examined mean-level change. As compared to rank-order stability, which represents broad-based indicators of trait continuity, mean-level change allows a more direct examination of the clinical levels of change of psychopathic traits over time and should be further examined. Finally, additional information regarding change in a treatment context is needed. Rogers et al. (2004) used a relatively short testing and treatment interval (average of 6 months) and measured psychopathy using an infrequently studied measure (i.e., the PS-24) that does not permit a dimensional analysis of the construct. Further research regarding the potential for change in psychopathy scores in individuals engaged in active treatment is needed to supplement the existing literature.

In summary, although a growing body of research has led to a better understanding of the continuity and change of psychopathic traits over time, more research is needed to further explain how these traits change within adolescence. Based on these results, it appears that psychopathic traits may be more malleable during adolescent development. Instead of limiting the utility of the construct, these findings have important implications for understanding the developmental trajectory of the disorder as well as information relevant to intervention strategies. Further research is needed to examine those correlates of change, which may provide insight regarding not only the risk factors, but also the protective factors that may impact development and maintenance of the disorder in adolescence.

### **Relational Patterns between Psychopathic Traits and Psychopathological Domains**

If adolescent psychopathy shares a similar nomological net to adult psychopathy, some researchers argue that the disorder should manifest similarly in adults and youth (Seagrave & Grisso, 2002). Adult psychopathy measures often demonstrate a theoretically meaningful pattern

of convergent and divergent relations with external criteria across the various dimensions of the construct (e.g., Hare, 2003; Blonigen et al., 2010; Harpur et al., 1989). This pattern has been observed with the psychopathological domains of externalizing and internalizing symptomatology.

**Psychopathic traits and externalizing symptoms in adults.** Studies with adult populations consistently show positive associations between psychopathic traits and externalizing symptoms, specifically childhood externalizing disorders such as CD, ODD, and attention-deficit/hyperactivity disorder (ADHD) (Klinteberg, 1996; Lilienfeld & Waldman, 1990; Lynam, 1996). Consequently, symptoms of these disorders are typically considered risk factors for the development of severe antisocial behavior disorders (e.g., Lynam, 1996; Pardini & Loeber, 2008). In fact, some researchers believe that the combined presence of these disorders in youth is highly predictive of adult psychopathy (Lynam, 1996). Other researchers have argued that due to the high comorbidity between CD, ODD, and ADHD (Biederman, Mick, Faraone, & Burbach, 2001; Biederman et al., 2002; Monuteaux, Faraone, Gross, & Biederman, 2007), the relationship among these disorders is an artifact of the shared variance between ADHD and ODD on the one hand and CD on the other (Lilienfeld & Waldman, 1990; Abramowitz, Kosson, & Seidenberg, 2004). At the factor level, in general, externalizing symptoms exhibit modest to negligible associations with scores on Factor 1, the affective-interpersonal factor, but converge strongly on Factor 2, the social deviance factor (Hare, 2003; Patrick, Hicks, Krueger, & Lang, 2005).

**Psychopathic traits and externalizing symptoms in adolescents.** As in adults, psychopathic traits in adolescents are positively associated with externalizing symptoms (Kosson et al., 2002). In a large sample of adolescent boys, Lynam (1998) reported that boys with comorbid ADHD and CD most closely resembled psychopathic adults scoring higher than ADHD-only boys and CD-only boys on the CPS, self-reported delinquency, and on measures of response perseveration and executive impairment. However, in both adolescents and adults,

studies have reported stronger relationships between psychopathy and CD symptoms than other externalizing disorders, supporting the hypothesis that CD symptoms relate uniquely to psychopathy (e.g., Abramowitz et al., 2004; Kosson et al., 2002). For example, in a sample of 115 adolescent males, Kosson et al. (2002) found that PCL:YV total scores were positively associated not only with CD but also ODD and ADHD symptoms; however, the correlations between these scores and CD symptoms were significantly greater than correlations with ADHD and ODD symptoms. In a study of female and male adolescent offenders, Sevecke, Kosson, and Krischer (2009) specifically examined the main effects of and interaction between ADHD and CD symptoms. They found that comorbid ADHD and CD significantly predicted PCL:YV total scores, but the influence of ADHD was largely attributable to the overlap between ADHD and CD. At the factor level, they found that when controlling for the independent effects of ADHD and CD, respectively, only CD symptoms significantly predicted PCL:YV factor scores in boys, demonstrating strong and approximately equivalent positive associations with the affective, lifestyle, and antisocial factors, and somewhat lower associations with the interpersonal factor.

Overall, these findings suggest that although comorbid ADHD, ODD, and CD symptoms are associated with higher PCL:YV total scores in adolescents, CD symptoms uniquely contribute to this convergent relationship in this population. At the factor level in male adolescents, the strongest relationships appear to be between CD symptoms in particular, and the lifestyle and antisocial factors of the PCL:YV; a finding that corresponds with adult studies with the PCL-R. However, CD symptoms also have exhibited strong positive relationships with all four factors of psychopathy, including the interpersonal and affective factors, marking a divergence from the adult literature. The unique positive associations found between total and factor scores on the PCL:YV and CD symptoms support the conduct problem-mediated subtype hypothesis and have important implications for the treatment of youth with these traits.

Prior research with children with conduct problems and high levels of callous-unemotional (CU) traits<sup>1</sup> (e.g., limited empathy and guilt, constricted emotionality) has shown that these youth demonstrate reduced sensitivity to cues of punishment once a reward-oriented response set has been activated and reduced reactivity to threatening and emotionally distressing stimuli (Blair, 1999; Frick, Cornell, Barry, Bodin, & Dane, 2003). Given that youth exhibiting traits consistent with psychopathy tend to show conduct problems earlier in their development (Frick, 2006) and there are numerous interventions that have proven effective in treating earlier conduct problems (Eyeberg, Nelson, & Boggs, 2008), intervention earlier in the developmental trajectory of conduct problems is ideal (Frick, 2009). Clinical wisdom is that, when intervention occurs later in development, it should emphasize the reward-oriented style of these youth (e.g., descriptive praise, token reinforcement) and attempt to motivate such youth by appealing to their self-interest, rather than through interventions that focus solely on punishment-oriented strategies (Frick, 2009).

**Psychopathic traits and internalizing symptoms in adults.** Contrary to the convergent relational pattern typically seen between adult psychopathy and externalizing symptoms, internalizing symptoms are typically unrelated, or negatively related, to adult psychopathy (Lilienfeld & Perna, 2001; Schmitt & Newman, 1999). This pattern is consistent with traditional conceptualizations of psychopathic individuals as being incapable of feeling human emotions such as empathy, anxiety, or guilt (Cleckley, 1941/1976).

At the factor level in adult populations, internalizing symptoms do exhibit associations with psychopathy; however, they typically show negative associations with scores on Factor 1 and positive associations with scores on Factor 2 (Benning et al., 2005; Hicks & Patrick, 2006; Verona, Hicks, & Patrick, 2005). These associations indicate that adult psychopathic individuals

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<sup>1</sup>Some researchers believe that conduct-disordered children with CU traits demonstrate a particular severe and chronic pattern of antisocial behavior that shares many characteristics of adult psychopathy, particularly in the interpersonal and affective dimensions (Frick, Cornell, Barry, Bodin, & Dane, 2003).

who show elevated levels of internalizing symptoms also show higher scores on Factor 2, suggesting that in adults, internalizing symptoms relate uniquely to the behavioral components of psychopathy. Such individuals would fit Karpman's (1941, 1948) conceptualization of the secondary psychopath. Karpman (1941, 1948) conceptualized the secondary psychopath as exhibiting a broad range of internalization (e.g., anxiety, neuroticism, emotional reactivity). Research to date has found that the secondary psychopath exhibits higher scores on Factor 2 or the social deviance factor of psychopathy. Conversely, the primary psychopath is marked by a profound lack of internalization and shows higher elevations on Factor 1 or the affective-interpersonal factor of psychopathy.

**Psychopathic traits and internalizing symptoms in adolescents.** Recent studies of adolescents have found considerable comorbidity with internalizing disorders and psychopathic traits (Frick, 2002; Kosson, et al., 2002; Kubak & Salekin, 2009). Additionally, at the factor level, internalizing symptoms do not show the consistent negative associations with scores on Factor 1 and positive associations with scores on Factor 2 that are generally seen in the adult literature (e.g., Kubak & Salekin, 2009).

In a study of 130 juvenile offenders, Kubak and Salekin (2009) examined the relationship of psychopathy, as measured by PCL:YV and APSD total and factor scores, and anxiety symptoms using the two-factor model. In this study, anxiety symptoms included trait anxiety, measured by the generalized anxiety disorder (GAD) scales of the Adolescent Psychopathology Scale—Anxiety Disorder Scales (APS; Reynolds, 1998), and trauma symptoms, measured by the combined separation anxiety disorder (SAD) and post-traumatic stress disorder (PTSD) scales of the APS. They found that PCL:YV and APSD total scores were both positively and significantly correlated with anxiety symptoms measured by the APS, a departure from the adult literature and Cleckley's original conceptualization. At the factor level, they found that the correlations between trait anxiety symptoms and Factor 1 and Factor 2 scores were modest and approximately equivalent ( $r = .16, p < .10$  and  $.15, ns$ , respectively). The SAD/PTSD composite

showed approximately equivalent modest but significant correlations on Factor 1 and Factor 2 scores ( $rps = .16$  and  $.19$ ,  $ps < .10$ , respectively).

Additionally, in a recent study by Sevecke, Lehmkul, and Krischer (2009), the authors found that anxious-depressive behavior emerged as a significant negative predictor of PCL:YV total scores in male adolescent offenders, a finding consistent with the adult literature. However, these authors found a positive relationship between a measure of internalizing symptoms, comprised of the anxious/depressive, somatic complaints, and social withdrawal subscales of the Youth Self Report (YSR; Achenbach, 1991), a divergence from the adult literature. At the factor level, positive associations were found for both anxious-depressive behavior and the internalizing composite with affective factor scores, a component of Factor 1 scores, but no positive associations were found between these internalizing criteria and lifestyle or antisocial factor scores, which correspond to Factor 2 scores. These findings signify a departure from prior findings with adult samples finding negative associations with Factor 1 and positive associations with Factor 2.

These patterns demonstrate a divergence from the typical patterns found between internalizing symptoms and adult psychopathy, and, consequently, a notable developmental difference from the nomological net surrounding adult psychopathy. Only one of the studies using PCL:YV found the inverse relationships between a measure of internalizing symptomatology and psychopathy predicted by Cleckleyan theory and the adult literature (Sevecke, Lehmkul, et al., 2009). None of these studies found the positive associations with Factor 2 components (i.e., lifestyle and antisocial) that are typically seen in adults and associated with secondary psychopaths. Additionally, Sevecke, Lehmkul, et al., (2009) found that individually a measure of anxious-depressive behavior was a significant negative predictor of PCL:YV total and affective scores while a composite that also included somatic complaints and social withdrawal was a significant positive predictor of these same scores. Although the authors attributed this relationship to the strong association between social withdrawal symptoms and

psychopathy (Sevecke, Lehmkuhl, et al., 2009), this finding may suggest that depression, which is also closely associated with these symptoms, exhibits unique relationships with psychopathic traits in youth. Overall, these findings suggest that internalizing symptoms relate more broadly to psychopathic traits in youth across all dimensions. This conclusion may have important implications for understanding the etiology and the course of the disorder as well as informing intervention strategies for youth with these traits.

The more broad positive associations indicate that internalizing symptoms co-occur with psychopathic traits at a higher rate than expected in youth and that youth with psychopathic traits experience internalizing symptoms not identified by Cleckley (1941/1976) such as anxiety and trauma symptoms (Kubak & Salekin, 2009) and depressive symptoms (Sevecke, Lehmkuhl, et al., 2009). Additionally, it has been suggested that the risk-taking and antisocial behavior engaged in by psychopathic adolescents leads to numerous stressful events (e.g., incarceration, familial discord, criticism and disapproval by others), which, in turn, causes high levels of negative affect and anxiety in these individuals (Frick, 1998; Lilienfeld, 1994; Moffitt, 2003; Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Lilienfeld & Penna, 2001). Although it has not been empirically tested, this theory implies that adolescents with psychopathic traits respond with more negative affect and anxiety than adults to stressful events. Overall, these theoretical positions are consistent with the developmental principle of heterotypic continuity, and suggest that psychopathy looks quite different, in this respect, in adolescents than it does in adults.

This difference in the manifestation of the internalizing-psychopathy relationship in adult and adolescent populations also may have important implications for treatment. The presence of internalizing symptoms may be a protective factor for the development and maintenance of the disorder and may assist in treating youth exhibiting psychopathic traits. In general, the presence of anxiety at the initiation of therapy has been noted as a positive prognostic sign with adults (see Garfield, 1994). Thus, the lack of internalization that epitomizes psychopathy often is described

as the primary reasons psychopathic individuals are considered to be untreatable (Salekin, 2002). If internalization processes are active in adolescents, then the window for treatment may be open.

Woody, McLellan, Luborsky, and O'Brien (1985) found that adult males with antisocial personality disorder (APD) manifested little benefit from psychotherapy while those who exhibited comorbid depression showed significant improvement across multiple problem areas. Because internalizing symptoms such as anxiety and depression co-occur at a higher rate in youth with psychopathic traits, psychotherapy may be more useful with youth exhibiting these traits than it would be in adults. In summary, the more broad positive associations found between psychopathic traits and internalizing symptoms in youth may provide insight into the developmental pathway of psychopathy. Interventions targeting those environmental factors that may have contributed to the development of the disorder (e.g., socialization, parental influence, and past trauma) (Lykken, 1995; Porter, 1996) that are delivered at those critical time periods when these individuals are experiencing higher levels of internalizing symptoms may have greater success.

### **Influence of Externalizing and Internalizing Symptoms on Continuity and Change of Psychopathic Traits**

Given the observed comorbidity between internalizing and externalizing symptoms and adolescent psychopathic traits, it is somewhat surprising that very few studies have examined whether these symptoms predict continuity and change in these traits. Of those studies examining the predictive utility of such symptoms, all have focused primarily on externalizing symptoms. The stability study by Frick and colleagues (2003) discussed earlier also examined potential predictors of the stability of psychopathic traits, including conduct problems. They found that children with higher levels of conduct problems tended to have more stable levels of psychopathic traits, even after controlling for initial levels of these traits. In a later study of 177 clinic-referred boys assessed annually from recruitment (ages 7 to 12) through age 19, Burke, Loeber, and Lahey (2007) found that conduct problems significantly predicted PCL:R Factor 1

and Factor 2 scores at age 19, but did not find anxiety and depression to be predictive of PCL-R scores. Pardini and Loeber (2008) examined change in interpersonal callousness (IC), a personality feature associated most closely with the interpersonal and affective features of psychopathy (Frick, Cornell, Barry, Bodin, & Dane, 2003; Loeber, Burke, & Lahey 2002; Pardini, Obradović, & Loeber, 2006) during four years in adolescence with a community sample of 506 boys (ages 14 to 18). They found that, with respect to IC, comorbid ODD/CD and ADHD symptoms were among the best predictors of elevated levels of IC over time. They found that children with higher levels of these symptoms exhibited higher estimated levels of IC at initial assessment. Although higher initial levels of externalizing symptoms were associated with greater decreases in the slope of IC over time, boys with higher levels of externalizing symptoms continued to exhibit higher levels of interpersonal callousness at final assessment.

### **The Current Study**

As a personality disorder, psychopathy traditionally has been presumed to emerge at an early age and persist in a stable pattern across the lifespan. A growing body of literature examining the rank-order stability of psychopathic traits in adolescents has indicated that these traits appear to be somewhat less stable in adolescents than in adults. However, no studies, to date, have examined the mean change in psychopathic traits, as measured by the PCL:YV, in adolescents during the adolescent period across the four validated dimensions of the measure. Moreover, only one study (Rogers et al., 2004) has done so with an intervening period of active psychological treatment, and this study found only modest change in psychopathy scores. One purpose of this study was to examine the mean-level change in PCL:YV total and factor scores between pre- and post-treatment administration in a sample of male adolescent offenders. Additionally, despite extensive empirical support for theoretically meaningful patterns of divergent and convergent relationships between adult psychopathy and internalizing and externalizing symptomatology (Blonigen et al., 2010), the relationship between these psychological domains and psychopathy remain unclear within the child and adolescent literature

(Kubak & Salekin, 2009; Skeem & Cauffman, 2003). Moreover, to date, only a handful of studies (Pardini & Loeber, 2008; Burke et al., 2007) have examined the influence of externalizing or internalizing symptomatology on the continuity and change in psychopathic traits over time. Thus, a second purpose of this study is to examine the relative influence of externalizing and internalizing symptoms on continuity and change in PCL:YV total and factor scores between administrations. The issues of continuity and, more importantly, change in adolescent psychopathic traits and the correlates of such change have important implications for understanding the developmental course of psychopathy and informing intervention strategies.

The current study investigated the change in psychopathic traits and the correlates of change in a sample of male adolescent offenders adjudicated for committing a sexual offense. The research questions for this study are as follows: First, is there change in the level of psychopathic traits between pre- and post-treatment administrations? Second, where does this change occur across the interpersonal, affective, lifestyle, and antisocial dimensions? Third, do pre-treatment levels of internalizing and externalizing symptomatology influence change in these traits?

## **Method**

### **Setting**

The present investigation was conducted at the Mt. Meigs juvenile detention complex, a residential facility operated by the State of Alabama's Department of Youth Services (DYS). The Mt. Meigs campus is the designated treatment site for all adolescents adjudicated for a sexual offense in the state of Alabama. Through a contract with the state of Alabama, the Accountability Based Juvenile Sexual Offender Assessment and Treatment Program (ABSOP) was developed through a partnership among the Auburn University Department of Psychology, the University of Alabama School of Social Work, and DYS.

### **Participants**

The original sample consisted of 702 male adolescents adjudicated for committing a sexual offense in the state of Alabama and sentenced for various durations at Mt. Meigs. The data reduction technique of exploratory factor analysis (EFA) was used in this sample to inform the creation of composite scores to operationalize internalizing and externalizing psychopathology. As a part of their sentence, these individuals were ordered by the court to participate in an empirically-based treatment and rehabilitation program while incarcerated. Prior to beginning the treatment program, these individuals complete an extensive multi-modal assessment protocol which includes, among other measures, the PCL-YV as a measure of psychopathy and the Schedule for Affective Disorders and Schizophrenia for School-Aged Children-Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1996) as a measure of psychopathology. At the conclusion of the individual's therapeutic program and prior to release, a post-treatment assessment protocol is administered, which also includes the K-SADS-PL. The PCL:YV was only recently added to the post-treatment assessment protocol. To conduct the

primary analyses for the study, the original sample was reduced to an experimental sample comprised of those participants who had received the post-treatment administration of the PCL:YV.

At each administration, each individual was provided with a detailed consent form as well as an opportunity to discuss specific details regarding their possible participation in the ongoing body of research conducted at the Mt. Meigs campus. Potential participants were instructed that their consent was strictly voluntary and that no negative consequence would occur if they did not participate in the research component of the clinical interview and assessment battery. Once consent was obtained, the procedures used to maintain the confidentiality of all information collected for research were explained to the participants, and all participants were encouraged to respond openly and honestly to all questions. Advanced graduate student researchers administered the PCL:YV and K-SADS-PL at each administration. Extensive training specific to incarcerated individuals was required of all graduate students who participated in the administration of assessment measures. This training included building rapport with participants, interviewing skills, scoring/coding self-report measures, interview questions, and rating scales.

For the preliminary EFA analysis, 702 participants were administered pre-treatment assessments. Of those, 688 (98.0%) met the criteria for inclusion in this level of the analysis because these participants had (a) provided informed consent to participate in the study, (b) been administered the K-SADS-PL at pre-treatment, and (c) had no missing values for key measures. During the course of the study, seven individuals (.010%) from the larger sample withheld consent and opted not to participate. For these 702 participants, the age at initial assessment ranged from 10.67 to 20.17 years with a mean age of 15.74 years ( $SD = 1.58$  years). Racial composition was as follows: 394 (56.1%) Caucasian American, 282 (40.2%) African American, 7 (1.0%) Hispanic American, and 13 (1.9%) and 3 (0.4%) identified themselves as belonging to the bi-racial and “other” categories, respectively. Of the original sample of 702 participants, only

90 participants met the criteria for inclusion in the experimental sample because these participants had (a) provided informed consent to participate in the study, (b) been administered the PCL:YV and K-SADS-PL at both pre- and post-treatment administrations, and (c) had no missing values for those measures. Except for one participant who was not administered the K-SADS-PL at pretest, the only reason participants were excluded from the experimental sample was the lack of post-treatment PCL:YV scores. No participant in the experimental sample was excluded for withholding informed consent. For the experimental sample of 90 participants, the average age at final assessment was 16.04 years ( $SD = 1.56$  years; range = 12.35 years and 19.29 years). For this sample, racial composition was as follows: 55 (61.0%) Caucasian Americans, 29 (32.2%) African Americans, 3 (3.3%) Hispanic Americans, and 3 (3.3%) identified themselves as bi-racial or “other”.

## **Measures**

**Psychopathy Checklist: Youth Version.** Psychopathic characteristics were assessed using the Psychopathy Checklist: Youth Version (PCL:YV; Forth et al., 2003). The PCL:YV consists of a semi-structured interview and a 20-item clinical rating scale that is designed to evaluate psychopathic characteristics and behaviors in 12 to 18-year-old male and female adolescents. Each PCL:YV item is scored on a 3-point ordinal scale (0, 1, or 2) based on the degree to which the personality and behavior for the adolescent matches the item description with 2 indicating the item applies to the youth, 1 indicating the item applies to a certain extent but not the degree required for a score of 2, and 0 indicating the item does not apply to the youth. Items are scored based on multiple sources including the semi-structured interview with the adolescent, a review of records, and collateral information. The PCL:YV demonstrates good to excellent psychometric properties including high interrater reliability (single-rater intraclass correlation of .90 to .96) (Forth et al., 2003), high internal consistency (Cronbach’s alpha coefficients ranging from .85 to .94) (Forth et al., 2003; O’Neill, Lidz, & Heilbrun, 2003), high single-rater reliability (.90) (Catchpole & Gretton, 2003), and adequate test-retest reliability

coefficients for total scores using the two-factor (.66) and three-factor models (.58) (Skeem & Cauffman, 2003).

**Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL).** Externalizing and internalizing symptomatology was assessed using the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL; Kaufman, et al., 1996). The K-SADS-PL is a diagnostic screening interview assessing current and past major symptoms of DSM-IV mental disorders applicable to children and adolescents. The K-SADS-PL was not designed to provide a specific diagnosis, but to recognize the specific signs and symptoms of DSM-IV mental disorders. Interrater reliability is reported to be excellent at 99.7%, and interrater agreement was also high regarding diagnostic decisions. Test-retest reliability for diagnosis assignments was in the excellent to good range for most present and lifetime diagnoses, and reliability k coefficients were reported in the excellent range for most disorders (present and/or lifetime diagnoses of major depressive disorder, any depression, depressive disorder NOS, any bipolar disorder, GAD, any anxiety, CD, and ODD) and in the good range for present diagnoses of PTSD and ADHD (Kaufman, et al., 1996). Ratings of symptoms and impairment are generally based on a 4-point severity scale ranging from 0—“no information available” to 3—“threshold criteria met.” For the purposes of this study, only the child report was assessed and symptom presence for a particular diagnostic category was defined as a score of 3 on any symptom comprising that category. Symptom presence for a diagnostic category was scored as 1 and subthreshold or absence of symptoms was scored as 0. For the current study only present (within the last six months) K-SADS-PL items were used.

To construct meaningful composite variables representing internalizing and externalizing symptomatology for use in the primary analysis, EFA of pre-treatment K-SADS-PL items for the original sample was conducted. Although a number of participants were excluded from analysis because of missing data, there was still a small percentage of missing data (i.e. < 3%) for the K-

SADS-PL for those included in this level of the analysis. After initial data cleaning, an EFA of the K-SADS-PL diagnostic items was conducted to inform the construction of composite variables representing internalizing and externalizing symptomatology. Prior to conducting the EFA, the K-SADS-PL symptomatology to be examined was reduced to eliminate symptom presence with low base rates (i.e., more than 90% of the sample did not indicate symptom presence) and substance use disorders in order to focus more on overt externalizing behaviors. Simple phobias including avoidant social phobias also were excluded from the examination based on prior research recommending the exclusion of these disorders from analysis because they are less conceptually related to psychopathy (Frick et al., 1999; Kubak & Salekin, 2009). The remaining K-SADS-PL categories were subjected to EFA using a principal components extraction method and an oblique (direct oblimin) rotation as recommended by Tabachnik & Fidell (1996). Consistent with Tabachnik & Fidell's (1996) recommendations regarding factor analysis, multiple indices (e.g., Kaiser's (1960) criterion (eigenvalues > than 1) and Cattell's (1966) scree test) were used and suggested a two-factor solution consistent with internalizing and externalizing symptoms that accounted for 51% of the total variance in this sample. The rotated pattern matrix is presented in Table 2.

Results revealed an externalizing factor included symptom presence for CD, ODD, and ADHD, which was used to measure externalizing symptomatology. For internalizing symptomatology, the EFA revealed an internalizing factor comprised of GAD, separation anxiety disorder (SAD), depressive disorder, and PTSD. This factor was further divided into anxiety (GAD/SAD) and depressive-trauma (PTSD/depressive disorder) composites to measure the different dimensions of internalizing symptomatology in the primary analyses for several reasons. First, the current trend in the adolescent psychopathy literature is not only to examine the relationship between psychopathic traits and internalizing symptoms but also to examine the relationship between these traits and the various dimensions of the internalizing spectrum. For example, Kubak and Salekin (2009) examined the relationship between adolescent psychopathic

traits and two dimensions of anxiety. These authors conceptualized trait anxiety in terms of GAD symptoms because they felt the disorder “cleanly captures” trait anxiety (e.g., by removing simple phobias) (Kubak & Salekin, p. 276) and conceptualized an environmentally-influenced dimension of anxiety as comorbid PTSD and SAD. Given current research indicating that comorbid PTSD and depression is a common outcome from and risk factor for correlates of sexual offending (Holmes, Foa, & Sammel, 2005; Paolucci, Genuis, & Violato, 2001), it was hypothesized that PTSD and depression may interact uniquely with psychopathy in this population. Second, empirical patterns emerging within the sample suggested that a dimensional analysis of the internalizing spectrum would be more appropriate for this population. Zero-order correlations between these diagnostic categories and pretest psychopathy scores were examined in the larger sample. Symptom presence for each of the four internalizing categories from the K-SADS-PL demonstrated moderate to high intercorrelations with PCL-YV total scores. However, GAD and SAD symptom presence each revealed more consistent patterns of negative associations with most of the psychopathic dimensions while PTSD and depression each revealed more consistent patterns of positive associations with these dimensions. Based on these observed relationships and current research regarding sexual offenders and comorbid PTSD and depression, the internalizing factor was divided into anxiety (GAD/SAD) and depressive-trauma (PTSD/depressive disorder) composites to measure the different dimensions of internalizing symptomatology in the primary analyses.

### **Procedure**

The measures were administered to the participants upon admission to and prior to release from treatment. After consent was obtained and shortly after a participant’s admission to Mt. Meigs, advanced graduate students in clinical psychology conducted interviews and clinical assessments including the PCL:YV and K-SADS-PL. Pretest administration of these measures occurred within approximately five to seven days following admission to Mt. Meigs. Posttest administration of the PCL:YV and K-SADS-PL occurred prior to release with a mean retest

interval of 401.46 days following admission ( $SD = 247.36$  days; Range = 44 to 1,128 days). Current assessment procedures in the program require that staff refer the participants for post-treatment assessment within 30 but preferably 60 days of their anticipated release date. At the time of post-treatment, virtually all participants are still engaged in individual therapy with their assigned therapists. There is some variability in the types of group treatment to which each individual is exposed and the length of ongoing group treatment. Although all participants have completed some form of group therapy by post-treatment assessment as a program requirement, some boys have participated in additional treatment groups targeted towards specific individual problems (e.g., social skills). Moreover, at posttest, some boys will have completed all group treatment while others will still be engaged in group treatment programs. Thus, with some exceptions, the testing interval in the experimental sample roughly corresponds to the length of incarceration and treatment for the participant.

### **Data Analysis Plan**

The primary analyses were conducted with the experimental sample of 90 participants and organized to address the study's main goals. Prior to conducting the primary analyses, visual inspection of the data for both samples was conducted for missing values and accuracy of data entry. Preliminary analyses of the data in this sample showed that parametric tests were inappropriate, as the assumptions regarding non-normality were violated and could not be corrected by standardization of values or transformation of the variables, and nonparametric alternatives were used as appropriate. Spearman's rank correlation coefficients (Spearman's rho) tested the associations between the continuous predictor variables and psychopathy total and factor scores, because many variables were skewed. To examine the change in participants' psychopathy scores and symptomatology across treatments, mean differences were compared using the Wilcoxon signed-rank test. For these comparisons, an effect size,  $r$ , was calculated for each score by dividing the  $z$  value by the square root of  $N$ , where  $N$  = number of observations over the two time points (Rosenthal, 1991; 1994). This effect size was interpreted using Cohen's

(1988) criteria where 0.1 = small effect, 0.3 = medium effect, and 0.5 = large effect. Results obtained with these nonparametric tests were compared to results obtained from the parametric equivalents, Pearson's correlation coefficients and the paired samples *t*-test, respectively, and were essentially identical.

A series of hierarchical multiple regression analyses were then used to determine the main effects of pre-treatment variables on the change in total and factor psychopathy scores across treatment. Change in adolescent psychopathic traits was modeled using the regressor variable method, which appeared to be most appropriate for our data based on recommendations made by Allison (1990). To address the robustness of the estimated confidence intervals and *p*-values for these relationships, all results were bootstrapped using SPSS Ver. 19.0. Bootstrapping is a non-parametric technique that yields accurate parameter estimates even with highly skewed variables, and can be used to assess the degree to which the estimated regression coefficients would be likely to vary across other random samples of the same population (Chernick, 2008). Essentially, this approach treats the sample as a population and repeatedly resamples the data by replacement to create alternate samples on which to fit the regressions (Efron and Tibshirani, 1993). The number of bootstrap samples drawn for each analysis was set to 5,000.

## Results

### Preliminary Analyses

**Descriptive statistics.** Only one participant was excluded from analysis because of missing data because he had not been administered one of the primary measures during the study. After initial data cleaning, descriptive statistics were obtained for the experimental sample. These results are summarized in Table 3. In general, both administrations were characterized by wide variability in PCL:YV total and factor scores. Overall, psychopathy scores were higher at pretest, but both administrations were characterized by PCL:YV total scores that were considerably lower than those typically seen in delinquent populations (pretest:  $M = 12.79$ ; Range = 1 - 29; posttest:  $M = 9.02$ ; Range = 1 - 24).

With respect to current symptomatology, at pretest most participants did not endorse symptoms of anxiety (SAD and GAD) ( $M = .31$ ; Range = 0 - 2) or depressive-trauma (depressive disorder and PTSD) ( $M = .48$ ; Range = 0 - 2). Only 24.5% endorsed symptom presence for either SAD or GAD while only 37.8% endorsed symptom presence of either depressive disorder or PTSD. Conversely, more participants endorsed externalizing symptoms at pretest ( $M = 1.01$ ; Range = 0 - 3) with 62.8% of participants endorsing symptom presence of ADHD, ODD, or CD at pretest. At posttest fewer participants overall endorsed depressive-trauma symptoms ( $M = 0.35$ ; Range = 0 - 2) and externalizing symptoms ( $M = 0.66$ ; Range = 0 - 2), but more endorsed anxiety symptoms ( $M = 0.24$ ; Range = 0 - 2). An analysis of pre-treatment and post-treatment

differences using the Wilcoxon signed ranks test revealed that there was only a significant decrease in externalizing scores between administrations ( $Z = -2.68, p < .01, r = .28$ ).

**Zero-Order Correlations.** Zero-order correlations (Spearman's rho) between pre-treatment variables and pretest and posttest psychopathy scores are presented in Table 3. All values were standardized before analysis. Consistent with prior studies examining the relationship between age and psychopathy, there is no relationship between PCL:YV scores and age at pre-treatment assessment (Brandt, Kennedy, Patrick, & Curtin, 1997; Gretton, Hare, & Catchpole, 2004; Murrie, Cornell, Kaplan, McConville, & Levy-Elkon, 2004). Consistent with prior studies with adult and adolescent populations, externalizing symptom presence was significantly and moderately correlated with pretest PCL:YV total scores and affective, lifestyle, and antisocial scores ( $r_s = .47, .36, .45, \text{ and } .37$ , respectively,  $p_s < .001$ ) as well as interpersonal scores ( $r = .28, p < .01$ ). Notably, this pattern was not observed with posttest scores, where only posttest PCL:YV total scores ( $r = .21, p < .05$ ) and antisocial scores ( $r = .29, p < .05$ ) were significantly associated with externalizing symptomatology, indicating weaker relationships between externalizing symptoms and psychopathy at posttest, especially in the interpersonal, affective, and lifestyle dimensions where only negligible positive associations were observed. More consistent with findings from the adult literature, anxiety symptoms were associated only with pretest antisocial scores ( $r = .22, p < .05$ ), which corresponds to Factor 2 of the two-factor model. Comorbid depression and trauma symptoms were not significantly associated with psychopathic traits at either pre- or post-treatment, but indicated a general pattern of stronger positive associations with post-treatment scores than was observed with anxiety symptoms. In general, correlations between internalizing and externalizing symptomatology and posttest psychopathy scores were much lower than for pretest scores.

## **Primary Analyses**

**Change in psychopathy scores.** Pre-treatment and post-treatment differences in psychopathy total and factor scores were examined using the Wilcoxon signed ranks test. Table 4 contains mean scores, standard deviations, effect sizes, and univariate analysis results for PCL:YV total and factor scores. With respect to psychopathy total and factor scores, results of the analysis indicated that there was a statistically significant decrease between administrations for PCL:YV total scores and interpersonal, affective, and lifestyle scores, but not antisocial scores. Additional relationships between pretest and posttest scores were explored via the hierarchical multiple regression analysis as discussed below.

**Correlates of change in adolescent psychopathic traits.** A series of hierarchical multiple regression analyses were conducted to determine the main effects of the primary study variable on the change in total and factor scores between assessment periods. In each regression, the applicable post-treatment PCL:YV score (i.e., PCL:YV total and the interpersonal, affective, lifestyle, and antisocial factors, respectively) was entered as the dependent variable. Consistent with the regressor variable method, the applicable pre-treatment PCL:YV score was then entered as the first block in all regression analyses. Then demographic variables (age at pre-treatment assessment and the assessment interval) were entered as the second block. Because prior research has shown that childhood CD symptoms are a significant predictor of adult psychopathy (Burke et al., 2007), comorbid CD and ODD symptoms are a risk factor for the maintenance of interpersonal callousness (IC) throughout adolescence (Pardini & Loeber, 2008), and similar evidence has not been identified for internalizing symptomatology, it was hypothesized that the externalizing composite would be more likely to influence change in psychopathy after treatment than the internalizing composites. Thus, the externalizing composite was entered as the third

block in all regression analyses. In the fourth and final block, the depressive-trauma and anxiety composites were entered concurrently to determine the independent effects of these two dimensions of internalizing symptomatology on the change in psychopathy levels. Listwise deletion of cases with missing data was conducted for all regression analyses. All values were standardized before analysis.

For each estimated regression coefficient, 95% confidence intervals were constructed based on the empirical sampling distributions created by the bootstrap using the percentile method (Hox, 2002). These confidence intervals depict the range of plausible regression coefficients that one might encounter from other random samples. The confidence intervals obtained from the bootstrapping procedure align with the observed results. All of the confidence intervals corresponding to the significant predictors do not include 0, which indicates that the findings are replicated in more than 4,750 of the bootstrapped samples and that the true population relationship is indeed different from 0 in these cases. The results of each regression analysis (including regression coefficients, corresponding confidence intervals, and change statistics) are depicted individually in Tables 5, 6, 7, 8, and 9, respectively.

**Total scores.** As shown in Table 5, in the first regression analysis predicting PCL:YV total scores after treatment, pre-treatment PCL:YV total scores were entered in the first block and accounted for 36% of the model variance,  $F(1, 89) = 50.43, p < .001$ . While the demographic variables were positively correlated with posttest PCL:YV scores, their addition in the second block did not make a statistically significant contribution to the prediction of posttest scores ( $R^2 = 38\%$ , *ns*). The addition of the externalizing composite in the third block did not lead to a significant increase in the amount of variance accounted for in the model ( $R^2 = 39\%$ , *ns*); however, it is noteworthy that this composite demonstrated negative, albeit negligible,

correlations with posttest scores. Thus, contrary to prior findings, externalizing symptom presence at pretest did not predict an increase in levels of posttest psychopathic traits. The addition of the anxiety and depressive-trauma composites in the final block significantly increased the amount of model variance accounted for to 44%,  $F(6, 73) = 10.75, p < .001$  with only depressive-trauma symptom presence at pretest emerging as a significant predictor of a decrease in total scores between administrations. In summary, neither the pre-treatment variables of age at assessment, externalizing or anxiety symptom presence, nor the assessment interval significantly predicted change in total scores between administrations. Contrary to prior findings, these results provide strong evidence that internalizing symptom presence, but not externalizing symptom presence, influences change in psychopathic traits during the adolescent period in individuals engaged in active treatment.

**Factor scores.** Subsequent regressions (shown in Tables 6, 7, 8, and 9) explored the prediction of posttest scores for the four validated dimensions underlying adolescent psychopathy as measured by the PCL:YV. In the second regression analysis (shown in Table 6) predicting interpersonal scores after treatment, pre-treatment interpersonal scores were entered in the first block and accounted for 13% of the model variance,  $F(1, 89) = 13.05, p < .01$ . After controlling for pre-treatment scores, the addition of the control variables in the second block increased the amount of variance accounted for to 18%,  $F(3, 786) = 5.41, p < .01$ , and while both age at pre-treatment assessment and the assessment interval were positively correlated with posttest change in interpersonal scores, only the assessment interval emerged as a significant positive predictor of this change in scores. The addition of the externalizing composite in the third block did not lead to an increase in the amount of variance accounted for in the model ( $R^2 = 18\%$ , *ns*). As observed with total scores, this composite was negatively associated with posttest

interpersonal scores in this sample. After controlling for externalizing symptom presence and the other study variables, the assessment interval continued to significantly predict interpersonal scores. The addition of the anxiety and depressive-trauma composites in the final block significantly increased the amount of variance accounted for to 24%,  $F(6, 83) = 4.46, p < .01$ , with depressive-trauma symptoms emerging as a significant negative predictor of interpersonal scores. Although anxiety symptom presence was positively associated with posttest interpersonal scores, it did not contribute significantly to these scores. Additionally, in block 5, after controlling for all other study variables, the assessment interval continued to significantly predict a significant increase in interpersonal scores in this model. Thus, longer detention periods in this sample corresponded to higher interpersonal scores. In summary, pre-treatment age and externalizing and anxiety symptom presence did not significantly predict posttest interpersonal scores. Notably, depressive-trauma symptoms at pretest were associated with decreased levels of interpersonal features of psychopathy such as grandiosity, impression management, lying, and manipulativeness at posttest. Moreover, after controlling for all other variables, the assessment interval emerged as a significant positive predictor of interpersonal scores, indicating that longer assessment intervals and consequently longer periods of incarceration and treatment were associated with higher levels of interpersonal features of psychopathy at posttest.

In the third regression (shown in Table 7) predicting affective scores after treatment, pre-treatment affective scores were entered in the first block and accounted for 15% of the model variance,  $F(1, 89) = 15.30, p < .001$ . None of the other variables entered contributed significantly to the model after controlling for pre-treatment affective scores.

In the fourth regression (shown in Table 8) predicting lifestyle scores after treatment, pre-treatment lifestyle scores were entered in the first block and accounted for 9% of the model

variance,  $F(1, 89) = 8.53, p < .01$ . None of the other variables entered contributed significantly to the model after controlling for pre-treatment lifestyle scores.

In the fifth and final regression predicting antisocial scores after treatment, pre-treatment antisocial scores were entered in the first block and accounted for 62% of the model variance,  $F(1, 89) = 140.49, p < .001$ . Not surprisingly, given that these scores are comprised primarily of historical items and should not change between administrations, none of the other variables entered contributed significantly to the model after controlling for pre-treatment antisocial scores.

In summary, regressions showed that while pre-treatment scores were the primary predictor of post-treatment scores, there were meaningful correlates of change in psychopathic traits between assessments. The regressions showed that only internalizing symptomatology and the assessment interval contributed significantly to a change in psychopathic traits by posttest. Although anxiety and depressive-trauma symptomatology showed divergent relationships with adolescent psychopathic traits, only depressive-trauma symptom presence predicted change (decrease) in these scores between administrations. At the factor level the assessment interval, roughly approximating the length of incarceration and treatment, was associated with an increase in the levels of interpersonal traits of psychopathy, while depressive-trauma symptom presence was associated with reductions in these levels. Contrary to hypothesis and prior findings, externalizing symptom presence did not predict any increase in psychopathy scores in this sample.

## **Discussion**

### **Change in Adolescent Psychopathic Traits**

The current study investigated the change in psychopathic traits and the relationships between the study variables and psychopathic traits to determine the correlates of change in a sample of 90 male adolescent offenders. Change in psychopathic traits was examined by comparing mean PCL:YV total and factor scores before and after treatment. An analysis of this change showed robust differences over time in treatment for mean PCL:YV total scores and across the interpersonal, affective, and lifestyle dimensions of psychopathy, but not the antisocial dimension. Thus, at posttest, adolescent sex offenders who have been in treatment an average of approximately 13.81 months demonstrate significant mean decreases in scores in the affective dimension, which assesses deficits in affective experience; the interpersonal dimension, which assesses an arrogant, deceitful interpersonal style; and the lifestyle dimension, which assesses an impulsive and irresponsible behavioral style. It should be noted that the magnitude of this change was quite remarkable. Effect sizes were large for mean total scores and mean affective scores while moderate effective sizes were estimated for interpersonal and lifestyle scores. As expected, there appears to be less change in antisocial scores between administrations.

Before the current results are compared to prior research, it should be noted that the present analysis of change does not provide information regarding reliability or rank-order continuity or individual-level change from occasion to occasion. Such analyses would require a research design permitting analysis across set intervals. Thus, the present results cannot

be directly compared to those results from literature measuring continuity and/or change in this manner. Moreover, all participants in the present study were engaged in active treatment during the assessment interval. No published studies have provided information regarding the change in PCL:YV scores in a forensic adolescent population engaged in active treatment.

With respect to total scores, the current results are fairly consistent with Lynam et al.'s (2007) study examining both rank-order stability and mean-level change in total scores using the PCL:SV and CPS. These authors found significant mean-level change and modest rank-order continuity in psychopathic traits between adolescence and adulthood. Conversely, these results are inconsistent with Lynam et al.'s (2009) findings of less mean-level fluctuation in total scores from age 7 to age 18 across various time points using a short form of the CPS. These authors concluded that mean-level psychopathy does not change substantially as a function of age or the number of previous assessments. However, the current analysis differs because change in this study is being examined without regard to subject-specific attributes present in the Lynam et al. (2009) study and all participants in the present study were engaged in active treatment during the assessment interval, which could account for higher levels of change. Moreover, Lynam et al. (2009) were examining psychopathy using a childhood self-report measure, which may fail to adequately capture the interpersonal and affective dimensions of psychopathy, those areas where this study generally identified the most mean-level change (see e.g., Edens et al., 2000). Overall, the robust differences found in mean PCL:YV total scores in the current research indicate that meaningful change in psychopathy levels is occurring at the group level between assessments. Additional research examining both mean-level and individual change in total scores is needed to further clarify these results. The current results indicate profound change in the core psychopathic traits reflected by interpersonal, affective, and lifestyle scores. Notably, the current

results finding substantial mean-level change in the interpersonal and affective dimensions are inconsistent with findings by Blonigen et al. (2006) of less change in mean Factor 1 scores, which includes the interpersonal and affective dimensions. However, the current results indicating significant decreases in lifestyle scores are consistent with these prior findings of some decline in mean Factor 2 scores, which include the lifestyle and antisocial dimensions (Blonigen et al., 2006). As expected, these boys do not appear to show significant changes in anger problems, criminal behavior, or other delinquent behaviors reflected by antisocial scores. No published studies have examined change in PCL:YV scores using the four-factor model. Therefore, there is no current data on the continuity and change solely in the antisocial dimension. However, the lack of meaningful change in these scores is generally consistent with hypothesis given the historical nature of the items comprising this dimension and prior studies finding less change in Factor 2 scores, which are comprised of the lifestyle and antisocial dimensions (Skeem & Cauffman, 2003). Overall, the significant change found in interpersonal, affective, and lifestyle scores at the mean level indicates that meaningful change is occurring in the average level of these traits in this sample across treatment. Consistent with prior findings using the two-factor model and hypothesis, these results indicate less change in mean antisocial scores.

Current research regarding mean-level personality changes among the Big Five personality traits in early, middle, and late adolescents may also provide a helpful context for interpreting the present findings. In a longitudinal study of 876 adolescents aged 12 to 18, Pullman, Raudsepp, and Allik (2006) concluded that from the age of 14 years onwards, adolescents tend to become more tolerant, open to new ideas, more emotionally stable, and exhibit less neuroticism. Higher levels of extraversion and openness and lower levels of

neuroticism have generally been associated with better response to psychotherapy (e.g., Quilty et al., 2008). The general personality trends of middle and late adolescence may play a role in enhancing treatment response in this population largely comprised of adolescents transitioning from middle adolescence (age 14 to 16) to late adolescence (age 16 to 18). Thus, general trends in personality traits suggest that adolescents may be developmentally primed for treatment during this period and more likely to respond positively to treatment.

The interpretation of the magnitude of the change observed in total and factor scores depends on the context (e.g., forensic assessment, trait development, or treatment) in which the adolescent psychopathy construct is being used and one's perspective on continuity and change in personality traits (e.g., classical or developmental). For this discussion, it is helpful to first examine the results at the dimensional level with respect to those dimensions reflecting the core features of psychopathy where meaningful change occurred (i.e., the interpersonal, affective, and lifestyle dimensions) before examining the results obtained for total antisocial scores.

As noted earlier, contradictory perspectives have guided the expectations about continuity and change in personality traits; a classical perspective assumes that personality traits are relatively stable over time, while a developmental perspective predicts that these traits would be more malleable, especially in youth. From a classical perspective, the present results indicate that there is meaningful mean-level change between administrations in this sample across the interpersonal, affective, and lifestyle dimensions. Because the interpersonal and affective dimensions reflect the primary traits of psychopathy, more change in these dimensions would likely be troubling to a classical theorist, raising significant questions regarding the validity of the adolescent psychopathy construct, especially if one views adult levels of continuity as the bar. Moreover, significant change was observed in the lifestyle dimension, a core dimension of

Cleckley's original conceptualization of psychopathy. This observation casts some doubt on the extent to which a history of socially deviant behavior, as reflected by lifestyle scores, may account for the behavioral characteristics of psychopathy during adolescence (Skeem & Cauffman, 2003). From a forensic assessment perspective, the present findings of substantial change in mean scores at the factor level taken together with past findings of more modest stability coefficients in adolescent populations (Lynam et al., 2007) may suggest that psychopathy (specifically the core features of psychopathy) should not be used as a definitive or stand-alone indicator of risk in adolescents because there may be inherent variability in scores for these types of determinations (see Lynam et al., 2007). This variability may be further enhanced when adolescent offenders are engaged in active treatment.

In contrast, from a developmental perspective on psychopathology as well as a treatment perspective, the current results are encouraging. The present results are consistent with a developmental perspective and the principles of equifinality and multifinality, which would predict change via different developmental pathways during this period, especially in the context of environmental changes such as treatment and incarceration. From this perspective, the interpersonal and affective dimensions of psychopathy could show more change than the lifestyle and antisocial dimensions. Certain traits represented by the interpersonal and affective dimensions, such as grandiosity, glibness, and lack of guilt may appear later developmentally in response to the behavioral consequences (e.g., alienation of parents, peers, and teachers; arrest; incarceration) of other earlier appearing traits corresponding to the lifestyle and antisocial dimensions, such as callousness, impulsivity, and behavioral dyscontrol (Lynam et al., 2007). Alternatively, because the interpersonal and affective dimensions of psychopathy are more interpersonal in nature and depend more heavily on the assessment of interview behavior than

file information, these dimensions may be more temporally limited given that individuals may demonstrate more behaviors consistent with these features at intake and prior to treatment. These findings could also be attributable to maturational and learning effects on lifestyle items such as irresponsibility and impulsivity after exposure to an intensive treatment program emphasizing behavioral regulation and contingency management for an average treatment period of approximately one year.

Moreover, from a treatment perspective, these results indicate that meaningful change is occurring across these dimensions, which include the core interpersonal and affective features of psychopathy, and indicate that there is an opportunity for substantive treatment benefits for youth with psychopathic traits. Although no conclusive statements regarding treatment efficacy can be made without a control group, several factors related to the therapeutic environment at Mt. Meigs could be contributing to these changes. The core features of psychopathy may be more susceptible to interventions emphasizing interpersonal relationships with therapists, peers, teachers, and other treatment staff provided in the context of a structured and supportive therapeutic environment like Mt. Meigs. These changes may also be influenced by the particular treatment approaches used at Mt. Meigs. For example, in general, successful treatment at Mt. Meigs requires the offender to discuss their offenses in detail during group and individual therapy. Moreover, given the approach used by treatment staff, by the end of treatment these boys may be aware that lying about their offense and attempting to manipulate staff does not facilitate successful completion of the program, which may translate into decreases in interpersonal scores. Although the program is not specifically tailored to youth with psychopathic traits, these results are consistent with the expressed intent and therapeutic practices of treatment staff that emphasize reducing distorted beliefs that deny, justify, minimize,

and rationalize an offender's actions and may translate into decreases in affective scores (e.g., more empathy and remorse for victims).

With respect to psychopathic traits in the lifestyle dimension, treatment at Mt. Meigs may contribute to a more responsible and goal-oriented personal style. The program uses an incentive-based point system that rewards positive student behavior with certain privileges (e.g., books, games, and computer time). Serious problem behavior such as committing a criminal offense may cause a loss of such privileges; however, the program has a detailed grievance procedure that provides students with a dedicated representative to advocate their interests. Thus, individuals are held accountable for their actions in a fair manner but rewarded for positive changes in negative behaviors. Researchers have suggested that these types of interventions, rather than punishment-oriented strategies, are more effective for youth with psychopathic traits (Frick, 2009), which may translate into more change in these traits during treatment. Moreover, while at Mt. Meigs, the boys are encouraged to develop short-term and long-term goals for their lives. Boys are offered a multitude of opportunities to work towards such goals in the academic (e.g., special education services and GED courses), social (e.g., chess club and musical groups), and occupational (e.g., vocational courses) realms.

An examination of the present findings with respect to PCL:YV total scores and antisocial scores highlights the ongoing debate in the literature regarding how to conceptualize psychopathy in general, especially with respect to the role of antisocial behavior (see Lynam et al., 2007). At one end of the debate, Skeem and Cooke (2010) have criticized the prominent role criminal behavior plays in the item content of the PCL-R and its progeny even though this was not among Cleckley's original criteria. They argue that this emphasis on criminal behavior, especially past criminal behavior, contributes heavily to the reported stability in PCL total scores.

On the other side of the debate, Hare and others (e.g., Hare, 2003; Hare & Neumann, 2010; Neumann, Vitacco, Hare, & Wupperman, 2005) have argued that broadly defined antisociality, not criminality per se, is what the PCL-R and its progeny target, essential to Cleckleyan theory, and that psychopathy is a higher construct consisting of all four dimensions.

No studies have directly examined the stability of the antisocial dimension in an adolescent population. However, studies using the traditional two-factor model have typically found high levels of stability in Factor 2 scores, comprised of both lifestyle and antisocial scores, in both adolescent (Skeem & Cauffman, 2003) and adult (Rutherford et al., 1999) populations. Because most of the items comprising the antisocial dimension reflect past criminal behavior that typically does not change, less change would be expected in these scores. Moreover, although additional criminal behavior can occur in a juvenile forensic setting, the opportunities to engage in criminal behavior, especially more serious criminal behavior, are reduced given the more controlled environment, so even less change may be expected. As expected, the present findings indicate that antisocial scores do not change significantly across administrations. However, this lack of change in antisocial scores did not translate into similar results in total scores. Additional research using PCL:YV scores and the four-factor model is needed to determine whether the antisocial dimension influences change in the unitary construct of psychopathy.

In the current study, significant change was observed in mean PCL:YV total scores and across the interpersonal, affective, and lifestyle dimensions. Although the treatment program at Mt. Meigs is not designed for psychopathic offenders, the program addresses some of the features of the core psychopathic traits and may contribute to decreases in mean levels of these traits between administrations. Although no conclusive statements regarding treatment response can be made without a control group, the treatment approach used at Mt. Meigs with this

population during an optimal developmental period for change may increase the likelihood of change in these traits following active treatment. These findings provide support for the utility of a dimensional perspective on adolescent psychopathic traits, especially in the context of treatment. These results suggest that the core psychopathic traits (e.g., interpersonal, affective, and lifestyle) are appropriate targets for treatment and change. Additional research examining both mean-level and individual-level change using the PCL:YV and the four-factor model is needed to further clarify these results.

### **Correlates of Change in Adolescent Psychopathic Traits**

**Age and time.** Largely consistent with prior studies (Brandt et al., 1997; Gretton et al., 2004, Murrie et al., 2004), there appears to be no relationship between posttest PCL:YV scores and age at pretest assessment. Although the assessment interval was not a significant predictor of change in PCL:YV posttest total scores, it was a significant positive predictor of change in posttest interpersonal scores after controlling for the effects of pretest interpersonal scores and age at pretest assessment, and remained a significant positive predictor after accounting for externalizing and internalizing symptomatology. Thus the assessment interval, which in this sample also approximates the length of incarceration and treatment, is associated with a significant increase in posttest interpersonal scores after controlling for all other study variables, suggesting that longer periods of exposure to a detention environment may have an iatrogenic effect on interpersonal scores notwithstanding the potential benefits of treatment. Although meaningful decreases in interpersonal scores are occurring between testing administrations, these scores do not decrease, but instead significantly increase the longer the individual stays at Mt. Meigs. Although no studies were identified that examine the impact of treatment on PCL:YV interpersonal scores, Caldwell, McCormick, Umstead, and Van Rybroek (2007) examined

treatment effects in adolescent offenders exposed to an intensive behavioral treatment program for an average of nearly 45 weeks. Positive treatment effects (e.g., reduction in disruptive behavior, less recidivism) were found for adolescent offenders with more psychopathic features after exposure to treatment. These authors hypothesized that prior studies failing to find a treatment effect (O'Neill et al., 2003; Spain et al., 2004) used treatment protocols of shorter lengths and posited that the intensity and longer duration of their program contributed to the finding of effective treatment change. The present results suggest that such benefits may not extend to the interpersonal dimension in a forensic setting where longer treatment periods also correspond to longer periods of exposure to delinquent peers. Alternatively, treatment benefits may be more dependent on the intensity and treatment modality than solely on the duration. For example, Hare and colleagues (2000) have hypothesized that group therapy and insight-oriented programs may actually help adult psychopaths “to develop better ways of manipulating, deceiving, and using people, including staff.” (p. 630). Moreover, this effect may occur across disorders and treatment settings where individuals feign improvement to impress therapists or family members to gain early release from detention or another restricted setting (e.g., inpatient units) (Salekin, Worley, & Grimes, 2010). In addition, prior research has shown that delinquent peers have an ability to shape and maintain deviant behaviors for delinquent youth as measured by an increase in antisocial attitudes and beliefs following incarceration (Dishion, Mc Cord, & Poulin, 1999; McCord, 1992). Therefore, longer periods of exposure to certain types of treatment interventions and to delinquent peers may contribute to increases in interpersonal psychopathic traits such as deceitfulness and manipulateness.

**Externalizing symptoms.** Consistent with prior studies, a preliminary examination of zero-order correlations indicated that externalizing symptoms were significantly associated with

PCL:YV total (Kosson et al., 2002; Sevecke et al., 2009) and factor (Sevecke et al., 2009) scores. However, regression results from the primary analysis indicated that externalizing symptom presence at pretest does not predict an increase in PCL:YV scores. Although the regressions revealed no significant associations between PCL:YV scores and externalizing symptomatology, the direction of these associations was also inconsistent with prior research indicating that higher levels of externalizing symptoms such as ODD and CD are associated with elevations in levels of psychopathic traits during adolescence (e.g., Pardini & Loeber, 2008). In contrast, our results indicate that externalizing symptom presence was negatively associated with PCL:YV total and factor scores after treatment, with the strongest negative relationships observed with PCL:YV total and interpersonal and affective scores. That is, higher levels of externalizing symptoms at pretest appear to be more closely associated with decreases in these scores. Again, although definitive statements cannot be made regarding treatment outcomes without a control group, these findings taken together suggest that externalizing offenders in this sample may actually experience some very limited benefits from treatment in the form of lower psychopathy levels at posttest, especially with respect to primary psychopathic traits, the interpersonal and affective features of psychopathy.

**Anxiety symptoms.** A preliminary examination of zero-order correlations (Spearman's rho) with both pretest and posttest PCL:YV total and factor scores revealed that anxiety symptoms were significantly associated only with pretest antisocial scores. These findings are consistent with adult studies indicating that when internalizing symptoms do exhibit associations with psychopathy, they typically show positive associations only with scores on Factor 2, which includes the lifestyle and antisocial dimensions (Benning et al., 2005; Hicks & Patrick, 2006; Verona et al., 2005). With respect to change, anxiety symptom presence at pretest did not

significantly predict change in psychopathy total or factor scores across treatments. Notably, anxiety symptom presence at pretest did demonstrate modest positive relationships with change in PCL:YV total and factor scores. Further research using a control group and examining the treatment response of more anxious offenders is needed to help clarify these results and inform treatment strategies. Internalizing symptoms presence before treatment should be examined as both a risk factor and a protective factor for the development and maintenance of psychopathic traits during adolescence.

**Depressive-trauma symptoms.** A preliminary examination of zero-order correlations revealed that depressive-trauma symptoms demonstrated no or negative associations with pretest psychopathy scores. Regression analyses indicated that depressive-trauma symptoms at pretest are a significant predictor of reductions in post-treatment PCL:YV total scores and interpersonal scores after accounting for the effects of pre-treatment scores, demographic variables, and externalizing symptomatology. That is, higher levels of comorbid depression and trauma symptoms at pretest account for a meaningful decrease in PCL:YV total and interpersonal scores between administrations.

These observed empirical relationships are generally consistent with current research. The observed patterns of negative associations in the interpersonal dimension at pretest and the interpersonal and affective dimensions at posttest are consistent with Hare's (1991) conclusion that measures reflecting distress and dysphoria are unrelated or inversely related with Factor 1 scores, which correspond to interpersonal and affective factors, and Cleckley's clinical observations. With respect to change, however, these results represent an important finding that may have important implications for treatment. The presence of depressive-trauma symptoms at the beginning of treatment correspond to a reduction in PCL:YV total and interpersonal scores.

Although these findings are not determinative without a control group, in general, this reduction in psychopathic traits between assessments is consistent with prior research in adult populations with APD, a related but broader personality disorder than psychopathy, suggesting that depression symptoms at the beginning of treatment are associated with better therapeutic outcomes in this population (Woody et al., 1985).

No published studies have examined the influence of comorbid depressive disorder and PTSD on changes in PCL:YV scores from pretest to posttest; however, prior research has found that depression did not influence change in psychopathy scores (Burke et al., 2007). The current results may have several explanations. First, these results may be a by-product of the unique interaction of these symptoms in this population. In a comprehensive meta-analysis of 59 studies comparing male adolescent sex offenders ( $n = 3,855$ ), Seto and Lalumiere (2010) suggested that mood problems may have a protective effect in negative outcomes such as sexual recidivism with this population. These results could suggest a similar protective influence of mood problems on levels of psychopathic traits in adolescent sex offenders. Second, depression has been associated with improved treatment outcomes for individuals with antisocial personality traits (Woody et al., 1985). As noted earlier, internalizing symptoms such as depression occur at a higher rate in youth with psychopathic traits than in adults. Thus, adolescent sex offenders exhibiting psychopathic traits and depressive-trauma symptoms may be a population uniquely poised to benefit from treatment. Although no conclusive statements regarding treatment efficacy can be made without a control group, the assessment and treatment of depressive symptoms is a primary goal for ABSOP participants, and interventions related to depressive symptoms are frequently included on individual service plans. Third, the program's assessment procedures are informed by prior research indicating that prior abuse and neglect, specifically sexual abuse, is a

significant risk factor for sexual offending behavior. Therefore, these procedures target the identification of past abuse and neglect. As a result, prior victimization and abuse are more likely to be identified, reported, and considered in treatment. Treatment staff are sensitive to these issues and assess, monitor, and treat these symptoms to foster better progress through treatment and to facilitate placement needs. Although physical and emotional abuse is positively associated with psychopathic traits, treatment approaches used at Mt. Meigs may act to counteract these effects (Krischer & Sevecke, 2008). In addition, the treatment approach used with the participants emphasizes personal responsibility and accountability for sexual offending behaviors by targeting cognitive distortions such as minimization. Treatment staff endeavor to provide a supportive therapeutic environment where adolescents can process their prior victimization, but the boys are discouraged from using their prior victimization as a way of minimizing their responsibility for their victimization of others.

In addition, treatment interventions that address depressive-trauma symptoms may also play a beneficial role in reducing psychopathic traits, specifically in the interpersonal dimension. The presence of depressive-trauma symptoms at the beginning of therapy could play a critical role in reducing levels of psychopathic traits in the interpersonal dimension such as manipulation, lying, and deceitfulness. Alternatively, as mentioned earlier, given the treatment approach used by treatment staff, these boys may be more aware that lying about their offense and attempting to manipulate staff does not facilitate successful completion of the program. Further research using a control group is needed to determine if treatment responsiveness for psychopathic individuals varies as a function of the type of internalizing symptomatology present at pretest. Moreover, given that anxiety and depressive-trauma symptoms showed divergent

relationships with change in psychopathic traits during treatment, further research using these constructs is needed to clarify the present results.

### **Strengths and Limitations**

There are strengths to the present study including the availability of data at both pre- and post-treatment intervals. Because the PCL:YV is a semi-structured interview and is time consuming and requires additional personnel expenses, very few studies have examined PCL:YV scores before incarceration and prior to release in a forensic population. Many studies using the PCL:YV scores are based on file information only, which may reduce the reliability of these scores. The measures of psychopathy and psychopathology used in this study have been obtained from semi-structured interviews administered by trained graduate students as opposed to self-report measures. Children tend to be poor informants, especially when reporting psychopathology (Merrell, 2003). The use of the semi-structured interview allows for behavioral observations and reference to important collateral sources such as criminal and school records and reports to increase scoring accuracy. Unlike other studies that examine juvenile sex offenders who are receiving outpatient treatment, this sample is of juveniles adjudicated for a sexual offense. Thus, the present sample represents a more severely impaired group of juveniles compared to those represented in other studies. While a number of strengths exist, there are some study limitations that warrant further discussion.

First, as noted earlier, this sample represents those juvenile offenders adjudicated for a sexual offense, so the results of this study may not generalize to other populations, including other juvenile sex offenders (i.e., those being treated on an outpatient basis and those not otherwise adjudicated) or offenders who have been adjudicated for non-sexual crimes. Second, because all juvenile sexual offenders in this program are mandated to participate in both group

and individual therapy as a component of treatment, no wait-list or control group sample was available for comparison. As no control group was available for comparison, no conclusive statements regarding the efficacy of treatment can be made. Given the unique vulnerabilities and needs of this population, the formation of a true no-treatment group within this setting would likely be unethical. However, juveniles incarcerated for non-sexual crimes may be a target control population as their incarceration typically involves far less therapeutic processes and psychoeducation. Once an adequate control group can be identified, future research monitoring the relationships between adolescent psychopathic traits and psychopathology as well as other factors such as attachment and parenting style would be helpful.

Finally, certain characteristics of this sample may limit generalizability of these findings. Currently, the PCL:YV is administered only at pre- and post-treatment and is not administered at regular intervals for participants. Therefore, because a set testing interval is not used, this study does not directly examine reliability, rank-order continuity, or individual-level change in this sample. Additional PCL:YV administrations at regular, set intervals including a follow-up period could allow valuable insight into the reliability of this measure in a forensic population throughout adolescence and beyond. Although the sample size allowed sufficient power for statistical analysis, the smaller sample size and low PCL:YV scores may have affected our power to detect relationships between the primary study variables and change in psychopathy given the good test-retest reliability of the PCL:YV (Caldwell, Ziemke, & Vitacco, 2008). Due to our smaller sample size, we were unable to use a multi-modal approach combining both self-report and clinician-administered measures. Further studies should combine these measures to increase generalizability. Our results may also be influenced by the use of the regressor-variable model in the regression analysis of change with a smaller sample size. Although this method was more

appropriate based on the characteristics of our sample, it may reduce statistical power given the inclusion of pretest scores on a moderate to highly stable measure such as the PCL:YV that accounts for a significant proportion of total model variance as a predictor variable in the regression. Conducting research with a larger sample size would permit the use of more powerful statistical tests (e.g., repeated measures ANOVA, growth curve modeling) that would increase confidence in the generalizability of our findings.

### **Summary**

This study is an initial effort to examine the change in adolescent psychopathic traits between pre- and post-treatment administrations of the PCL:YV, and the influence of externalizing and internalizing symptoms assessed before treatment on change in psychopathy levels. Significant decreases were observed across pre- and post-treatment administrations for mean PCL:YV total and interpersonal, affective, and lifestyle scores. These reductions may reflect the interaction of short-term maturational effects during incarceration and the positive impact of treatment. Furthermore, mean antisocial scores demonstrated no change between administrations, which most likely represents the more static nature of these psychopathic traits in general and the decreased opportunity of incarcerated adolescents to participate in additional criminal activity in a correctional environment.

Additionally, the influence of demographic variables and externalizing and internalizing symptomatology on potential change in psychopathic traits was examined. The assessment interval accounted for a significant increase in interpersonal scores. Depressive-trauma symptoms were associated with a decrease in PCL:YV total and interpersonal scores. No other significant relationships were observed between the study variables and change in psychopathic traits after treatment. Although this study lacks a control group against which statistical

comparisons can be made, these results do provide evidence that adolescent psychopathic traits can change over the course of incarceration when individuals are engaged in active treatment. Moreover, the correlates of change identified in this study suggest that the presence of internalizing symptomatology at pretest can play a positive role in this change.

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Table 1

*A Comparison of Harpur, Hare, and Hakstian (1989) Two-Factor; Cooke and Michie (2001) Three Factor; and Hare and Neumann (2005) Four Factor Models*

Harpur et al. two factor model	Cooke and Michie three-factor model	Hare and Neumann four-factor model
<b>Interpersonal/Affective</b>	<b>Arrogant, Deceptive Interpersonal</b>	<b>Interpersonal</b>
Impression management	Impression management	Impression management
Grandiose sense of self worth	Grandiose sense of self worth	Grandiose sense of self worth
Pathological lying	Pathological lying	Pathological lying
Manipulation for personal gain	Manipulation for personal gain	Manipulation for personal gain
Lack of remorse	<b>Deficient Affective Experience</b>	<b>Affective</b>
Shallow affect	Lack of remorse	Lack of remorse
Callous/lacking empathy	Shallow affect	Shallow affect
Failure to accept responsibility	Callous/lacking empathy	Callous/lacking empathy
<b>Socially Deviant Lifestyle</b>	Failure to accept responsibility	Failure to accept responsibility
Stimulation seeking	<b>Impulsive, Irresponsible Behavior</b>	<b>Lifestyle</b>
Parasitic Orientation	Stimulation seeking	Stimulation seeking
Lacks goals	Parasitic Orientation	Parasitic Orientation
Impulsivity	Lacks goals	Lacks goals
Irresponsibility	Impulsivity	Impulsivity
Poor anger control	Irresponsibility	Irresponsibility
Early behavior problems		<b>Antisocial</b>
Juvenile delinquency		Poor anger control
Revocation of conditional release		Early behavior problems
		Juvenile delinquency
		Revocation of conditional release

Table 2

*Exploratory Principal Component Analysis Pattern Matrix for K-SADS-PL*

Item	Internalizing	Externalizing
Depressive Disorder	.56	.19
Separation Anxiety Disorder	.67	-.07
Generalized Anxiety Disorder	.67	-.10
Post-Traumatic Stress Disorder	.62	.02
Attention Deficit/Hyperactive Disorder	.03	.75
Conduct Disorder	-.03	.79
Oppositional Defiant Disorder	-.02	.84

*Note.* The amount of variance accounted for by the two factors was noted in the text.

K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children – Present and Lifetime Version.

Table 3

*Descriptive Statistics for Selected Study Variables at Pre-Treatment and Post-Treatment Assessment*

Variable	Pre-treatment			Post-treatment		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Age (years)	16.04	1.56	12.35 – 19.29	17.33	1.48	14.31 – 20
Assessment Interval (years) <sup>a</sup>	-	-	-	1.15	.75	.33 – 3.33
PCL:YV Total	12.79	6.31	1 – 29	9.02	4.94	0 – 24
PCL:YV Interpersonal	1.97	1.83	0 – 8	1.32	1.33	0 – 6
PCL:YV Affective	3.56	2.08	0 – 8	1.20	1.47	0 – 6
PCL:YV Lifestyle	3.44	1.81	0 – 9	2.70	1.87	0 – 9
PCL:YV Antisocial	3.00	2.17	0 – 8	2.82	2.05	0 – 8
Externalizing symptoms	1.01	0.59	0 – 3	0.66	0.96	0 – 3
Anxiety symptoms	0.31	0.67	0 – 2	0.24	0.53	0 – 2
Depressive-trauma symptoms	0.48	0.97	0 – 2	0.36	0.55	0 – 2

*Note.* PCL:YV = Psychopathy Checklist—Youth Version; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Externalizing Symptoms = symptom presence for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety Symptoms = symptom presence for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Disorder; Depressive-Trauma Symptoms = symptom presence for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

<sup>a</sup>Time between pre-treatment and post-treatment assessment.

Table 4

*Zero-Order Correlations (Spearman's Rho) Between Pretest Variables and PCL:YV Scores at Pretest and Posttest*

	PCL:YV (Pretest)									PCL:YV (Posttest)				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age <sup>a</sup>		-.11	.37	.00	-.05	-.02	-.13	-.13	.00	-.02	-.02	-.03	.12	-.06
2. Externalizing			.20	.03	.47***	.28**	.36***	.45***	.37***	.21*	.09	.07	.08	.29*
3. Anxiety				.55***	.08	.00	.04	.04	.22*	.08	-.10	.05	.13	.13
4. D-T					.09	.14	-.02	.05	.11	-.11	-.16	-.13	.02	.02
PCL:YV (Pretest)														
5. Total						.62***	.71***	.69***	.78***	.57***	.25*	.26*	.28*	.59***
6. Interpersonal							.31**	.28**	.39***	.41**	.24*	.18	.15	.37***
7. Affective								.38***	.35**	.34**	.09	.42***	.12	.26*
8. Lifestyle									.43***	.37***	.13	.08	.34**	.30**
9. Antisocial										.59***	.24*	.13	.26*	.76***
PCL:YV (Posttest)														
10. Total											.56***	.53***	.61***	.71***
11. Interpersonal												.36**	.21	.22
12. Affective													.15	.16
13. Lifestyle														.27*
14. Antisocial														

*Note.* PCL:YV = Psychopathy Checklist—Youth Version; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version; Externalizing = symptom presence at pretest for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety = symptom presence at pretest for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Symptoms; D-T = symptom presence at pretest for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

\* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ .

<sup>a</sup> Age (years) at pre-treatment assessment.

Table 5

*Comparison of Pre-Treatment and Post-Treatment Means of Adolescent Psychopathic Traits<sup>a</sup>*

Score	Pre-Treatment		Post-Treatment		$\Delta$	$T$	$r^b$
	$M$	$SD$	$M$	$SD$			
PCL:YV Total	12.79	6.31	9.02	5.05	-3.77	-5.60***	- 0.60
PCL:YV Interpersonal	1.97	1.83	1.32	1.36	-0.65	-3.19***	- 0.34
PCL:YV Affective	3.56	2.08	1.20	1.44	-2.36	-7.41***	- 0.78
PCL:YV Lifestyle	3.44	1.81	2.70	1.73	-0.74	-3.25**	- 0.34
PCL:YV Antisocial	2.99	2.17	2.82	2.16	-0.17	-1.05	- 0.11

*Note.* PCL:YV = Psychopathy Checklist—Youth Version

<sup>a</sup> Based on positive ranks using Wilcoxon signed ranked test.

<sup>b</sup>Effect size estimate (Rosenthal, 1991, 1994).

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$

Table 6

Summary of Hierarchical Regression Analysis for Variables Predicting Post-Treatment PCL:YV Total Scores

Variable	<i>B</i>	95% CI for <i>B</i> (Sample)	95% CI for <i>B</i> (Bootstrap) <sup>b</sup>	<i>t</i>	$\Delta R^2$
Block 1					.36***
PCL:YV Total <sup>a</sup>	.60	.44, .78	.44, .78	7.10***	
Block 2					.02
PCL:YV Total	.55	.37, .73	.36, .73	6.08***	
Age	.04	-.14, .22	-.12, .21	.46	
Assessment Interval	.16	-.04, .35	-.07, .34	1.61	
Block 3					.01
PCL:YV Total	.60	.40, .81	.39, .80	5.80***	
Age	.03	-.15, .22	-.13, .20	.36	
Assessment Interval	.16	-.04, .35	-.06, .34	1.63	
Externalizing Symptoms	-.10	-.30, .10	-.28, .09	-1.01	
Block 4					.05*
PCL:YV Total	.64	.43, .84	.42, .84	6.24***	
Age	.03	-.15, .22	-.14, .20	.35	
Assessment Interval	.14	-.05, .33	-.08, .32	1.50	
Externalizing Symptoms	-.14	-.34, .06	-.33, .05	-1.41	
Anxiety Symptoms	.18	-.03, .39	-.02, .36	1.75	
Depressive-Trauma Symptoms	-.27	-.48, -.07	-.42, -.10	-2.62*	

Note. PCL:YV = Psychopathy Checklist—Youth Version; Age = age (in years) at pre-treatment assessment; Assessment Interval = time (in years) between pre-treatment and post-treatment assessment; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Externalizing Symptoms = symptom presence for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety Symptoms = symptom presence for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Symptoms; Depressive-Trauma Symptoms = symptom presence for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

<sup>a</sup>Scores are for pre-treatment only.

<sup>b</sup>Bootstrap results are based on 5,000 bootstrap samples.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 7

Summary of Hierarchical Regression Analysis for Variables Predicting Post-Treatment PCL:YV Interpersonal Scores

Variable	<i>B</i>	95% CI for <i>B</i> (Sample)	95% CI for <i>B</i> (Bootstrap) <sup>b</sup>	<i>T</i>	$\Delta R^2$
Block 1					.36***
PCL:YV Interpersonal <sup>a</sup>	.36	.16, .56	.13, .59	3.63***	
Block 2					.05
PCL:YV Interpersonal	.32	.13, .52	.09, .54	3.29***	
Age	.05	-.16, .26	-.11, .22	.49	
Assessment Interval	.25	.04, .46	.03, .48	2.35*	
Block 3					.00
PCL:YV Interpersonal	.34	.14, .54	.09, .58	3.30**	
Age	.05	-.16, .26	-.12, .22	.45	
Assessment Interval	.26	.04, .47	.04, .50	2.39*	
Externalizing Symptoms	-.06	-.26, .15	-.28, .18	-.54	.06*
Block 4					
PCL:YV Interpersonal	.39	.19, .60	.14, .63	3.78***	
Age	.06	-.15, .26	-.11, .23	.53	
Assessment Interval	.25	.04, .46	.02, .49	2.39*	
Externalizing Symptoms	-.07	-.28, .14	-.30, .19	-.63	
Anxiety Symptoms	.04	-.21, .29	-.12, .23	.32	
Depressive-Trauma Symptoms	-.27	-.51, -.02	-.46, -.08	-2.18*	

Note. PCL:YV = Psychopathy Checklist—Youth Version; Age = age (in years) at pre-treatment assessment; Assessment Interval = time (in years) between pre-treatment and post-treatment assessment; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Externalizing Symptoms = symptom presence for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety Symptoms = symptom presence for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Symptoms; Depressive-Trauma Symptoms = symptom presence for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

<sup>a</sup>Scores are for pre-treatment only.

<sup>b</sup>Bootstrap results are based on 5,000 bootstrap samples.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 8

Summary of Hierarchical Regression Analysis for Variables Predicting Post-Treatment PCL:YV Affective Scores

Variable	<i>B</i>	95% CI for <i>B</i> (Sample)	95% CI for <i>B</i> (Bootstrap) <sup>b</sup>	<i>T</i>	$\Delta R^2$
Block 1					.15***
PCL:YV Affective <sup>a</sup>	.39	.19, .58	.21, .58	3.91***	
Block 2					.01
PCL:YV Affective	.40	.19, .61	.22, .60	3.77***	
Age	.07	-.14, .28	-.13, .28	.67	
Assessment Interval	.00	-.22, .22	-.22, .24	.02	
Block 3					.00
PCL:YV Affective	.40	.18, .63	.21, .63	3.57**	
Age	.07	-.14, .28	-.13, .28	.66	
Assessment Interval	.00	-.22, .23	-.22, .24	.04	
Externalizing Symptoms	-.02	-.24, .20	-.22, .18	-.17	
Block 4					.03
PCL:YV Affective	.41	.19, .64	.22, .63	3.66***	
Age	.07	-.14, .28	-.13, .27	.67	
Assessment Interval	.00	-.23, .22	-.24, .23	-.04	
Externalizing Symptoms	-.04	-.27, .18	-.25, .15	-.40	
Anxiety Symptoms	.16	-.09, .41	-.05, .39	1.26	
Depressive-Trauma Symptoms	-.21	-.45, -.04	-.44, -.02	-1.71	

*Note.* PCL:YV = Psychopathy Checklist—Youth Version; Age = age (in years) at pre-treatment assessment; Assessment Interval = time (in years) between pre-treatment and post-treatment assessment; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Externalizing Symptoms = symptom presence for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety Symptoms = symptom presence for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Symptoms; Depressive-Trauma Symptoms = symptom presence for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

<sup>a</sup>Scores are for pre-treatment only.

<sup>b</sup>Bootstrap results are based on 5,000 bootstrap samples.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 9

Summary of Hierarchical Regression Analysis for Variables Predicting Post-Treatment PCL:YV Lifestyle Scores

Variable	<i>B</i>	95% CI for <i>B</i> (Sample)	95% CI for <i>B</i> (Bootstrap) <sup>b</sup>	<i>t</i>	$\Delta R^2$
Block 1					.09***
PCL:YV Lifestyle <sup>a</sup>	.30	.10, .50	.14, .47	2.92**	
Block 2					.11
PCL:YV Lifestyle	.34	.12, .55	.16, .52	3.14**	
Age	.11	-.11, .32	-.14, .36	.97	
Assessment Interval	-.08	-.31, .15	-.34, .20	-.70	
Block 3					.11
PCL:YV Lifestyle	.33	.09, .57	.12, .57	2.71**	
Age	.11	-.11, .33	-.15, .35	.97	
Assessment Interval	-.08	-.31, .15	-.38, .20	-.71	
Externalizing Symptoms	.02	-.21, .26	-.25, .27	.19	
Block 4					.14
PCL:YV Lifestyle	.35**	.11, .60	.14, .61	2.85**	
Age	.10	-.12, .32	-.16, .35	.94	
Assessment Interval	-.09	-.32, .14	-.39, .19	-.80	
Externalizing Symptoms	-.01	-.26, .23	-.31, .26	-.10	
Anxiety Symptoms	.15	-.12, .41	-.06, .37	1.11	
Depressive-Trauma Symptoms	-.13	-.39, .12	-.32, -.05	-1.04	

Note. PCL:YV = Psychopathy Checklist—Youth Version; Age = age (in years) at pre-treatment assessment; Assessment Interval = time (in years) between pre-treatment and post-treatment assessment; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Externalizing Symptoms = symptom presence for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety Symptoms = symptom presence for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Symptoms; Depressive-Trauma Symptoms = symptom presence for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

<sup>a</sup>Scores are for pre-treatment only.

<sup>b</sup> Bootstrap results are based on 5,000 bootstrap samples.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 10

Summary of Hierarchical Regression Analysis for Variables Predicting Post-Treatment PCL:YV Antisocial Scores

Variable	<i>B</i>	95% CI for <i>B</i>	95% CI for <i>B</i> (Bootstrap) <sup>b</sup>	<i>t</i>	$\Delta R^2$
Block 1					.62***
PCL:YV Antisocial <sup>a</sup>	.78	.65, .92	.66, .91	11.85***	
Block 2					.01
PCL:YV Antisocial	.76	.62, .90	.61, .90	10.85***	
Age	-.04	-.18, .10	-.20, .11	-.56	
Assessment Interval	.09	-.06, .24	-.11, .25	1.2	
Block 3					—
PCL:YV Antisocial	.77	.62, .92	.63, .90	10.48***	
Age	-.04	-.19, .10	-.20, .11	.61	
Assessment Interval	.09	-.06, .24	-.11, .25	1.25	
Externalizing Symptoms	-.04	-.19, .10	-.18, .11	-.60	
Block 4					.01
PCL:YV Antisocial	.74	.63, .92	.64, .91	10.45***	
Age	-.04	-.18, .10	-.21, .11	-.57	
Assessment Interval	.09	-.06, .24	-.11, .25	1.22	
Externalizing Symptoms	-.04	-.19, .10	-.18, .10	-.61	
Anxiety Symptoms	.02	-.14, .19	-.14, .20	.28	
Depressive-Trauma Symptoms	-.09	-.25, .07	-.22, .06	-1.11	

*Note.* PCL:YV = Psychopathy Checklist—Youth Version; Age = age (in years) at pre-treatment assessment; Assessment Interval = time (in years) between pre-treatment and post-treatment assessment; K-SADS-PL = The Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version; Externalizing Symptoms = symptom presence for K-SADS-PL Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, and Conduct Disorder; Anxiety Symptoms = symptom presence for K-SADS-PL Separation Anxiety Disorder and Overanxious/Generalized Anxiety Symptoms; Depressive-Trauma Symptoms = symptom presence for K-SADS-PL Depressive Disorder and Post-Traumatic Stress Disorder.

<sup>a</sup>Scores are for pre-treatment only.

<sup>b</sup>Bootstrap results are based on 5,000 bootstrap samples.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .