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Examining the Relationship between Psychopathic Traits and Response Modulation Deficits
among Adult and Adolescent Offenders

THESIS

submitted in partial satisfaction of the requirements
for the degree of

MASTER OF ARTS

in Social Ecology

by

Stephanie Katherine Clark

Thesis Committee:
Professor Elizabeth Cauffman, Chair
Professor Jennifer Skeem
Professor JoAnn Prause

2014

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ABSTRACT OF THE THESIS

Examining the Relationship between Psychopathic Traits and Response Modulation Deficits
among Adult and Adolescent Offenders

By

Stephanie Katherine Clark

Master's of Arts in Social Ecology

University of California, Irvine, 2014

Professor Elizabeth Cauffman, Chair

According to Newman's response modulation hypothesis, psychopathy is underpinned by a cognitive processing deficit that interferes with the ability to attend to peripheral information. However, recent research and theory suggests that externalizing traits are also associated with performance deficits on response modulation tasks. This confusion over the specificity of response modulation deficits has been extended downward to adolescent populations during a time when normal development processes may account for observed deficits. In this study of 84 adult and 98 adolescent offenders, I examined whether the association between response modulation deficits and psychopathy is driven by specific underlying affective, interpersonal, and externalizing traits or an interaction between traits (assessed by the PCL-R/PCL:YV and PPI/YPI). Results indicate that affective features of psychopathy (PCL-R Affective and PPI Coldheartedness) were independently associated with response modulation deficits among adults. In contrast, externalizing traits (PCL:YV Antisocial; trend for YPI Lifestyle) were associated with *enhanced* response modulation among adolescents whereas scales assessing affective-interpersonal features of psychopathy manifested less of a relationship with response modulation deficits (trend for YPI Interpersonal). These findings raise questions about the

generalizability of response modulation and the assessment of psychopathy across developmental phases.

INTRODUCTION

Psychopathy is a personality disorder characterized by grandiosity, superficial charm, impulsivity, and a lack of remorse, empathy, and emotional reactivity. Cognitive deficits, such as response modulation, have been theorized to drive persistent maladjusted interpersonal and affective behavior among adults with psychopathic traits (Newman, 1998; Newman, Schmitt, & Voss, 1997). More recently, however, research has emerged suggesting that response modulation deficits may not be specific to psychopathy but may also be associated with externalizing traits (Hall, Bernat, & Patrick, 2007; Heritage & Benning, 2013; Molto, Poy, Segarra, Pastor, & Montanes, 2007).

Although externalizing traits are often conceptualized as part of the psychopathy construct, these traits are not unique to psychopathy. Externalizing traits are observed in other disorders such as antisocial personality disorder, conduct disorder, and substance abuse. Furthermore, this confusion over the specificity of response modulation deficits to psychopathy has been extended to adolescents (Vitale, Newman, Bates, Goodnight, Dodge, & Pettit, 2005). This is particularly problematic because adolescence is a time when normal developmental processes might otherwise account for observed response modulation deficits (Edens, Skeem, Cruise, & Cauffman, 2001; Seagrave & Grisso, 2002; Skeem & Cauffman, 2003). This leaves two important questions for clarification. First, clarifying whether core affective-interpersonal traits, externalizing traits, or an interaction among traits account for the association between response modulation deficits and psychopathy. Second, whether the associations found among adults manifest similarly within adolescent samples.

Operationalizing Psychopathy

There have been a number of different theories conceptualizing psychopathy (Cleckley, 1976; Fowles & Dindo, 2009; Karpman, 1941; Lykken, 1995; McCord & McCord, 1964). Recently, the Triarchic Model has attempted to integrate these perspectives defining psychopathy with three observable trait dimensions: boldness, disinhibition, and meanness (Patrick, Fowles, & Krueger, 2009). The first trait, boldness, captures the affective features of psychopathy and is a constellation of stress resiliency, social efficacy, lack of fear response, and need for high stimulation seeking. The second trait, disinhibition, consists of impulsivity, lack of foresight, and deficits in affect and behavior regulation. This disinhibition component is a general reflection of externalizing features (Krueger, Hicks, Patrick, Carlson, Iacono, & McGue, 2002). Lastly, meanness comprises a lack of empathy, callousness towards others, and coldheartedness, which reflects the interpersonal features of psychopathy. The Triarchic model represents an observable composition of traits. There are competing etiological theories that posit the underlying mechanism for these traits that may contribute to response modulation deficits. Two of these competing theories will be reviewed in the following section on response modulation.

Measures commonly used to assess psychopathy among both adult and youth samples reflect boldness, disinhibition, and meanness to different extents (Cauffman, Kimonis, Dmitrieva, & Monahan, 2009; Marcus, Fulton, & Edens, 2013; Skeem & Cauffman, 2003; Skeem, Polaschek, Patrick, & Lilienfeld, 2011). For example, the Psychopathy Checklist-Revised (PCL-R; Hare, 2003), underemphasizes the adaptive features of the boldness component, such as stress immunity, and overemphasizes criminal behavior and disinhibition (Skeem & Cooke, 2010). Whereas other measures, such as the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrew, 1996), include adaptive features and exclude assessment

of criminal behavior. Table 1 offers a comparison of four commonly used psychopathy measures, listing the factors or facets assessed by each measure and the items included within each factor/facet. Differences between measures of psychopathy suggest that to further the field's understanding of the association between psychopathy and response modulation deficits researchers need to include multiple measures of psychopathy. Using multiple measures to assess psychopathy will help to clarify whether observed associations are the result of idiosyncrasies of a measure or core features of psychopathy.

Response Modulation among Adults

The response modulation hypothesis is one etiological explanation for observed psychopathic traits. According to this perspective, core interpersonal and affective (meanness/boldness) features of psychopathy are due to an underlying cognitive deficits in attentional processing (Newman, 1998; Patterson & Newman, 1993). Specifically, when focused on a task, individuals with psychopathic traits are unable to process peripheral feedback from the environment and, as a result, fail to modify behavior appropriately. This inability to attend to feedback results in continued maladaptive behavior.

Support for this perspective comes from research focusing on attentional processing among individuals with high total psychopathy scores. For example, Hiatt, Schmitt, and Newman (2004) examined performance differences between 75 psychopathic and non-psychopathic Caucasian inmates on a picture-word interference task. During the task, inmates named pictures while attempting to ignoring distracter words superimposed within the pictures. According to the authors, faster response times on the task indicated greater response modulation deficits as inmates were less distracted by peripheral stimuli (i.e. the distracter words). Findings demonstrated that inmates with high psychopathic traits, as measured by PCL-R total scores,

coupled with low anxiety displayed greater response modulation deficits as compared to inmates with low psychopathy and low anxiety. The authors contended that the difference in interference between groups was support for the presence of a response modulation deficit specific to high psychopathic-low anxiety inmates. However, the use of total psychopathy scores limits our knowledge as to which specific traits captured within psychopathy measures drive observed response modulation deficits.

More recent research suggests that response modulation deficits are not specific to high psychopathic-low anxiety groups. As mentioned previously, these deficits can also be observed among individuals with externalizing traits. For example, Hall et al. (2007) found that individuals with high scores on a self report measure of externalizing displayed reduced attentional processing during a flanker discrimination task that required participants to categorize letters flanked by distracter stimuli. Specifically, when errors were made, high externalizing was associated with attenuated error-related negativity (ERN) amplitude, an electrical brain response that occurs during monitoring of conflicts (Yeung, Botvinick, & Cohen, 2004). Findings such as these lead the field to question whether observed response modulation deficits are due to core affective-interpersonal (i.e. boldness and meanness) traits of psychopathy or broader externalizing traits that (i.e. disinhibition) are shared with other disorders.

An alternative etiological perspective to the response modulation hypothesis is the dual process model (Patrick & Bernat, 2009) which incorporates evidence demonstrating the link between response modulation deficits and externalizing traits. In contrast to the response modulation hypothesis which posits that psychopathy is underpinned by a cognitive attentional deficit, the dual-process model suggest that two distinct mechanisms underlie core affective-interpersonal (i.e. boldness/meanness) and externalizing (i.e. disinhibition) traits of psychopathy.

The first process, trait fearlessness, is conceptualized as under-reactivity in the brain's defense (fear) motivational system. This deficit in fear reactivity results in problems with affective and interpersonal functioning (i.e. boldness and to a lesser extent meanness). In contrast, the second process, externalizing vulnerability, is conceptualized as cognitive impairments in the frontal cortex which result in greater impulsivity and dysregulation in affect and behavioral control (i.e. disinhibition). According to the dual-process perspective, response modulation deficits involving affectively neutral stimuli result from the externalizing vulnerability mechanism (i.e. disinhibition) whereas deficits involving affective stimuli are due to the trait fearlessness mechanism (i.e. boldness/meanness; Patrick & Bernat, 2010). This model suggests that the use of total psychopathy scores may mask differential associations that exist between response modulation deficits and underlying psychopathy traits.

There has been empirical support suggesting that, when using affectively neutral stimuli, observed response modulation deficits among psychopathic adults is driven by underlying externalizing traits, not affective-interpersonal traits (Molto et al., 2007). For example, Heritage and Benning (2013) examined the relationship between PPI dimensions of Fearless Dominance (i.e. core affective traits) and Impulsive Antisociality (i.e. externalizing traits) and response modulation among a sample of 66 adults recruited at a university emergency room. Response modulation was assessed using a stop signal task during which strings of letters had to be categorized as either words or non-words and responses withheld when a random auditory signal was presented. Results demonstrated that high Impulsive Antisociality traits were associated with decreased accuracy in word categorization, significantly longer response times to the auditory stop signal, and attenuated ERN amplitude. High Fearless Dominance traits, which comprise more of the unique core psychopathy traits (see Table1), was not significantly associated with

any task performance measurement. The authors conclude that the Impulsive Antisociality dimension, which assesses more externalizing traits, accounted for observed response modulation deficits.

However, there have been some contradictory findings suggesting that response modulation deficits are more closely associated with core affective-interpersonal traits when using affective neutral stimuli. For instance, Sadeh and Verona (2008) examined associations between dimensions of the PPI and response modulation deficits among a community sample of adult males ($n = 107$). Results revealed a significant correlation with the Fearless Dominance and Coldheartedness traits, but not Antisocial Impulsivity. These results are in conflict with those presented by Heritage and Benning (2013; see also Molto et al., 2007). However, it should be noted that the cognitive tasks used to assess response modulation were not consistent making comparisons across studies speculative. This lack of consistency of tasks used across studies may be one contributing factor to the confusion that persists in the response modulation literature.

Assessing Psychopathy and Response Modulation during Adolescence

Sorting out the association between core psychopathy traits, externalizing, and response modulation deficits becomes even more problematic among adolescent populations. Psychopathy measures have been extended downward from adults to youth with the assumption that deficits observed among adults will not only manifest similarly during adolescence but remain stable into adulthood (Kotler & McMahon, 2010; Skeem & Cauffman, 2003). However, some researchers have cautioned that the downward extension of psychopathy to adolescence is developmentally inappropriate (Edens et al., 2001; Skeem et al., 2011). Deficits that are thought to be features of psychopathy in adults may be normative during adolescence (Seagrave & Grisso, 2002; also see Moffit, 1993; Steinberg, Albert, Cauffman, Banich, Graham, & Woolard, 2008). For example,

the ability to fully appreciate the perspectives of others may not be fully formed which can result in an increased score on psychopathy measures (Seagrave & Grisso, 2002). Similarly, observed response modulation deficits could be due to cognitive processes that have not fully developed during adolescence, such as disinhibition.

Children and adolescents have been shown to be less effective than adults at inhibiting responses during laboratory tasks (i.e. disinhibition; Casey et al., 1997; Keating & Bobbitt, 1978). For instance, Ladouceur, Dahl, and Carter (2007) examined performance differences among early adolescents, late adolescents, and adults ($n = 46$) on a flanker discrimination task. Compared to the late adolescent and adult groups, the early adolescent group displayed poor performance on the flanker task which requires control over directing attention and inhibiting automatic responses. These results suggest that cognitive control, such as response inhibition and direction of attention, is still developing in early adolescence which could affect performance on laboratory tasks that assess response modulation. In other words, response modulation deficits displayed by adolescents may result from cognitive control that is not fully developed as opposed to being the result of psychopathic traits thought to persist into adulthood.

Similarly, externalizing traits, such as antisocial behavior, exhibited during adolescence may be a normal part of development and may not persist into adulthood (Moffitt, 1990, 1993). Moffitt (2006) posited that two types of antisocial behavior existed during adolescence: (1) a life-course persistent type marked by antisocial behavior that begins during childhood and continues into adulthood, and (2) an adolescent-limited type marked by antisocial behavior that begins during adolescence and desists before adulthood. The adolescent-limited type is theoretically part of the developmental stage as a way for youth to distance themselves from their parents and demand more rights and independence. This suggests that the relationship between

underlying psychopathy traits and response modulation may be weaker among adolescents than adults because processes that affect response modulation deficits, such as cognitive control and externalizing (Hall et al., 2007, Heritage & Benning, 2013; Patrick & Bernat, 2009), are relatively normative during this earlier developmental phase. This may be one (of many) reasons that adolescence is a difficult developmental period in which to accurately assess psychopathy (see Edens et al., 2001; Seagrave & Grisso, 2002, Skeem et al., 2011).

Despite these concerns over the appropriateness of assessing psychopathy among youth there has been some, albeit limited, research examining response modulation among adolescents. Studies using psychopathy total scores suggests that response modulation deficit can be assessed during adolescence. For example, reflecting groups similar to those found in Newman and colleagues adult studies (Hiatt et al., 2004; Newman, 1998; Newman et al., 1997), Vitale et al. (2005) examined performance differences on a picture-word interference task among a community sample of 164 male Caucasian 16 year olds. Psychopathy total scores were assessed using the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) and median splits on the Welsh Anxiety Scale (Welsh, 1956) were used to separate the sample into high and low anxiety groups. In comparison to those with low psychopathy scores coupled with low anxiety, the high psychopathy-low anxiety group displayed greater response modulation deficits as indicated by faster response times on the picture-word task. The authors interpreted these findings as evidence for the generalizability of response modulation deficits among adolescents.

Comparatively, adolescent studies examining the underlying traits of psychopathy suggest that, in comparison to externalizing features (i.e. disinhibition), the core affective-interpersonal features (i.e. boldness/meanness) are more strongly associated with response modulation deficits. For instance, Roose, Bijttebier, Van der Oord, Claes, and Lilienfeld (2013)

examined the relationship between response modulation on a discrimination task and psychopathic traits among a sample of male ($n = 73$) and female ($n = 6$) adolescents enrolled in an educational program for youth with behavioral problems. High callous-unemotional traits were significantly correlated with increased performance on the discrimination task. This suggests that, among adolescents, the interpersonal features of psychopathy (i.e. meanness) are more strongly associated with response modulation deficits than the externalizing features (i.e. disinhibition). Although these findings suggest that core psychopathy traits drive observed response modulation deficits among youth, caution should be taken when interpreting the results as this task was developed for this study and construct validity has yet to be established. Similarly, there are no adult data on this task to use for comparison.

In sum, the studies reviewed here provide initial support for an association between the externalizing traits (i.e. disinhibition) of psychopathy and response modulation deficits among adult populations. However, there are some inconsistent findings (Sadeh & Verona, 2008) suggesting a closer association with the core affective-interpersonal traits (i.e. boldness/meanness). Thus, it remains prudent to clarify the differential association found between the underlying traits of psychopathy and response modulation. Furthermore, because psychopathy is becoming more commonly assessed within adolescent populations (Skeem et al., 2011) it is crucial to understand if this relationship manifests similarly among youth. Previous studies suggest that there may be response modulation deficits among youth with psychopathic traits (Roose et al., 2013; Vitale et al., 2005), but caution should be used when interpreting these findings as observed deficits may be the result of normal developmental processes during adolescence.

Present Study

This study is the first to employ multiple measures of psychopathy across a sample of adolescent and adult offenders to allow for comparison of response modulation deficits. Because all measures are imperfect estimates of the construct they intend to measure (Cronbach & Meehl, 1955; Skeem & Cooke, 2010), using multiple measures with varied methodology reduces the likelihood of finding associations that are artifacts of the measures used.

This study has two aims. The first aim assesses the relations among the underlying traits of psychopathy and deficits in response modulation, as indexed by performance on an affectively neutral picture-word interference task. I expect that, among adults, externalizing traits will be more strongly associated with response modulation deficits than core affective-interpersonal traits. These expectations are based on (a) the growing body of empirical findings linking externalizing traits to observed response modulation deficits (Hall et al., 2007; Heritage & Benning, 2013; Molto et al., 2007) and (b) the dual-process perspective which suggests that, with neutrally affective stimuli (i.e. picture-word task), observed response modulation deficits are underpinned by the externalizing vulnerability mechanism (i.e. disinhibition; Patrick & Bernat, 2009). An alternative view is that both the response modulation and dual-process perspectives are correct and an interaction effect between psychopathy traits predicts observed deficits. To rule out this as a possible explanation, I will also examine whether an interaction between psychopathy traits predicts response modulation deficits.

The second aim is to determine whether the traits predicting response modulation deficits among adults will be similar among adolescents. Because cognitive control processes are still developing during adolescence (Casey et al., 1997; Keating & Bobbitt, 1978; Ladouceur et al., 2007) and some psychopathic traits overlap with normative adolescent behavior (Edens et al.,

2001; Moffitt, 2006; Seagrave & Grisso, 2002), it is expected that the relationship between response modulation and psychopathy traits will be weaker among adolescents as compared to adults.

Understanding how response modulation deficits relate to specific dimensions of psychopathy, and how this relationship may change by developmental phase, may have implications for future assessment. If we are using markers that are found in a broader array of disorders, such as externalizing, and not specific to psychopathy we may be misidentifying individuals as having psychopathic traits. We run an even higher risk among adolescents if response modulation deficits index normal developmental features rather than traits indicative of psychopathy. This is important because psychopathy assessments have become a part of legal and clinical decision making, such as sentencing length, program placement, and whether youth should be tried in juvenile or adult court (Skeem et al., 2011).

METHOD

To address these aims, adolescent and adult detainees were assessed for psychopathy using two alternate measures of psychopathy (one interview-based and one self-report) and a self-report measure of anxiety. Response modulation was indexed by performance on the picture-word interference task.

Participants

Participants were 99 juvenile and 85 adult male offenders incarcerated in correctional facilities in a large Northeastern state. The adolescent participants were between the ages of 14 and 17 ($M = 15.69$, $SD = 0.92$) and the adult participants were between the ages of 26 and 29 ($M = 27.50$, $SD = 1.16$). The sample consisted of predominately African American and Caucasian participants for both the adult and adolescent groups. Table 2 includes demographic information for the adult and adolescent samples separately.

Chi square and t-test were conducted to investigate if there were significant differences between the adult and adolescent samples on ethnicity, type of current offense, number of prior offenses, and IQ score (see Table 2). IQ was estimated from the Vocabulary and Matrix Reasoning subtests of the Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999). Significant differences emerged for type of offence, $\chi^2(3) = 45.48, p < .01$, and number of prior offenses, $t(151) = -3.33, p < .01$. Adults averaged more prior offences and were more likely to be currently incarcerated for a violent offence (e.g. murder, assault). Adolescents, on the other hand, were more likely to be currently incarcerated for procedural offences (e.g. probation violation), followed closely by violent offences.

To keep in line with previous research (Hiatt et al., 2004; Vitale et al., 2005) and control for a tradeoff effect between accuracy and speed on the picture-word task, participants who made

more than 5 errors were excluded from the final analyses. This resulted in the exclusion of one adult and one adolescent participant leaving a final sample of 84 adults and 98 adolescents.

Procedures

This sample was drawn from a larger cross-sequential study examining the stability of psychopathy scores among adolescent and adult offenders. Data were collected at four time points (baseline, one month, one year, and two years). This larger study attempted to recruit equivalent numbers of participants in the psychopathic (total score > 25) and non-psychopathic range as indicated by scores on the PCL-R and PCL-YV. Once the desired number of participants in the non-psychopathic range was reached, a psychopathic screening interview was implemented to help identify participants in the psychopathic range.

Eligible inmates were approached for recruitment and given a brief description of the study. Of those approached, 13% of adult, 11% of juveniles, and 4% of juvenile parents declined to participate. Informed consent was obtained from adult participants, assent was obtained from the juveniles, and informed consent was obtained from the parent/guardian. Participants were initially interviewed for approximately 2 hours at the correctional facility and for one hour during the three follow-up interviews. Follow-up interviews were conducted at either a correctional facility or in the community depending on whether or not the participant was incarcerated at the time.

The variables of interest in the current study were collected at baseline and during the one year follow-up interview. Demographic information, IQ scores, and anxiety scores were obtained during the baseline interview. The picture-word task was only administered during the one year follow-up interview. Although multiple measures of psychopathy were obtained at both time points, the current study used psychopathy data from the baseline interview for time consistency

with the measures of anxiety. The retention rate between these two time points was approximately 93%. Of those retained from the larger cross-sequential study ($n = 338$), approximately 54% ($n = 84$ adults, $n = 99$ adolescents) completed the picture-word task because the task was added during data collection at the one year follow up. There were no significant differences in ethnicity, age, number of prior offences, type of current offense, or IQ score between those who completed the picture-word task and those who did not.

Measures

Psychopathy

PCL. The Psychopathy Checklist – Revised (PCL-R; Hare, 2003) was used to assess psychopathic traits in adults and the Psychopathy Checklist – Youth Version (PCL-YV; Forth, Kosson, & Hare, 2003) was used for participants under the age of 18. Both versions of the PCL consist of a 20-item checklist of behaviors and characteristics thought to be emblematic of psychopathy (e.g. grandiosity, flat affect, callousness, antisocial behavior). Ratings of each item range from 0 (not present) to 2 (definitely present) and are based on a semi-structured interview and inmate file review. The PCL renders a total score ranging from 0-40 and four facet scores: interpersonal, affective, lifestyle, and antisocial. See Table 1 for a detailed description of items comprising each facet.

Research personnel ($n = 17$) were extensively trained to rate each item on the PCL. Training included 8 hours of reviewing and scoring 5 practice cases, observing and discussing two live interviews, monthly meetings to discuss scoring issues, and rating 3 review cases during data collection to avoid rater drift.

PPI-SF. The Psychopathic Personality Inventory-Short Form (PPI-SF; Lilienfeld, 1990, as cited in Lilienfeld & Hess, 2001) is a self-report measure of psychopathy containing 56 items

on a 4-point Likert scale. This shortened version of the PPI was developed from the 187 item full version PPI (Lilienfeld & Andrews, 1996). The full PPI consists of 8 subscales: Machiavellian Egocentricity, Impulsive Nonconformity, Blame Externalization, Carefree Nonplanfulness, Stress Immunity, Social Potency, Fearlessness, and Coldheartedness. The PPI-SF was formed using the seven items with the highest loading on each of the 8 subscales.

Exploratory factor analyses of the short form (Smith, Edens, & Vaughn, 2011) reveals a two factor structure similar to the factor structure of the full PPI (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Malterer, Lilienfeld, Neumann, & Newman, 2009), including Fearless Dominance (FD: Stress Immunity, Social Potency, and Fearlessness scales) and Self-Centered Impulsivity (SI: Machiavellian Egocentricity, Impulsive Nonconformity, Blame Externalization, and Carefree Nonplanfulness). Coldheartedness (CH) did not load onto either factor and some researchers argue that the Coldheartedness subscale may be considered a third factor of the PPI (Edens & McDermott, 2010; Lilienfeld & Widows, 2005; Neumann, Malterer, & Newman, 2008). Internal consistency for the two factors of the PPI-SF has been demonstrated in both community and incarcerated samples (FD $\alpha = .62-.83$, SI $\alpha = .78$; Smith et al., 2011). Construct validity of the two factors of the short form has been demonstrated with the FD factor negatively associated with psychotic symptoms, overall affect, and hostility and positively associated with extraversion and substance abuse. Conversely, the SI factor has been positively correlated with psychopathology and hostility and negatively correlated with extraversion suggesting that the SI indexes externalizing psychopathology (Smith et al., 2011).

In past research with the full version of the PPI (Benning et al., 2003; Malterer et al., 2009), FD and SI were often uncorrelated with one another. In the current adult sample, however, the FD and SI subscales were negatively correlated ($r = -.31, p < .01$). Published data

on the correlation between these factors for the short form, which was used in the present study, could not be found. Cronbach's alphas for the two factors in the current study are .61 and .75 (FD and SI factors respectively).

YPI. The Youth Psychopathic Traits Inventory (Andershed, Kerr, Stattin, & Levander, 2002) is a 50 item self-report measure of psychopathy for youth ages 12 and older. Each item is scored on a 4-point Likert scale where higher scores indicate more psychopathic traits. Items are framed in positive or neutral terms to reduce the likelihood of social desirability influencing responses. Prior factor analytic research suggests these items map onto 3 dimensions: Interpersonal (i.e. grandiose, manipulation, dishonest charm, lying), Affective (i.e. callousness, lack of emotion, lack of remorse), and Lifestyle (i.e. impulsivity, sensation seeking, irresponsibility; Andershed et al., 2002). Internal consistency is suggested by alphas ranging from .66-.93 (Andershed et al., 2002). Validity of the YPI is suggested by the significant correlation with the PCL-YV (Andershed, Hodgins, & Tengstrom, 2007; Cauffman et al., 2009). In the present study, the alphas for the YPI total and factor scores range from .80-.91.

Anxiety

STAI. The State-Trait Anxiety Inventory (Spielberger, 1983) is a self-report measure of anxiety designed to provide separate measures of "state" (SAI) and "trait" (TAI) anxiety. Each measure has 20 items rated on a 4-point Likert scale (1 = *almost never*, 4 = *almost always*). Scores range from 20-80 with higher scores indicating greater levels of anxiety. For the SAI, participants rate how they feel at the moment. For the TAI, participants rate how they generally feel. Factor analyses support the distinction between state and trait anxiety (Kendall, Finch, Auerbach, Hooke, & Mikulka, 1976; Spielberger, 1983). Previous research suggests that both scales have high internal consistency and adequate convergent and divergent validity (Barnes,

Harp, & Jung, 2002; Stanley, Beck, & Zebb, 1996). Because trait anxiety has been shown to have the strongest association with psychopathy (Hicks, Markon, Patrick, Krueger, & Newman, 2004), only TAI scores were used in subsequent analyses. In this study, Cronbach's alpha was .88 for TAI.

RCMAS. The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985) was used to assess anxiety among adolescents. This self-report measure consists of 37 yes/no items that are summed for a total. Scores range from 0-37 where a higher score indicates higher levels of anxiety. The RCMAS has demonstrated high internally consistent ($\alpha = .85$; Reynolds & Richmond, 1985) and high test-retest reliability ($r = .63$; Reynolds, 1981). The RCMAS is highly correlated with traditional measures of anxiety such as the State-Trait Anxiety measure for Children ($r = .88$; Muris, Merckelbach, Ollendick, King, & Bogie, 2002) supporting the construct validity of this scale. Cronbach's alphas for the current study range from .70-.86.

Response Modulation Measure: Picture-Word interference task

Response times on the Picture-Word interference task (PW; see Golinkoff & Rosinski, 1976; Rosinski, Golinkoff, & Kukish, 1975) were used to assess response modulation. The task consists of four separate stimulus cards. Each card is an 8x11 stimulus sheets with 20 equal sized cells. The first two cards are a warm-up exercise where participants name what they see in each cell as quickly as possible. The first card contains the printed name of an object or an animal in each cell (e.g. pot, cup, bear) and the second card contains single line drawings of objects or animals in each cell. The third and fourth cards contain lined drawings with distracter stimuli. Participants are instructed to name the picture while ignoring the distraction. The distracter stimuli on card 3 (incongruent distracter card) are superimposed words (e.g. hen, gun, seal) that

do not match the drawing. Card 4 (control distracter card) contains superimposed nonsensical strings of letters (e.g. cag, lup). The nonsensical condition manipulates the strength of the interference of the distracter stimulus because nonsensical words have no meaning for the subjects to process or inhibit alternative responses (Golinkoff & Rosinski, 1976; Rosinski et al., 1975). Response times and errors are recorded for each stimulus card.

A robust interference has been observed in which it takes longer to respond to stimuli when a distracter is present compared to when it is not present (de Zubicaray, Wilson, McMahon, & Muthiah, 2001; Friedman & Miyake, 2004). To address the specific aims of this study, an interference effect was calculated by subtracting the response time on card 4 (control distracters) from the response time on card 3 (incongruent distracters). Prior to calculating interference scores, response times on each card were Winsorized, in which values more than three standard deviations away from the group mean were reduced to the value equal to three standard deviations away from the mean. This technique was used to reduce the influence of outliers without further reducing the size of the sample.

RESULTS

The aims of the present study were to (a) assess the relationship between psychopathy traits and deficits in response modulation among adults and (b) assess whether the relationship is similar among adolescents. These aims were addressed using bivariate correlational analyses and Ordinary Least Squares (OLS) multiple regressions. Before addressing these aims, a manipulation check on the PW task was conducted to ensure that it produced an interference effect for both samples.

Manipulation Effect of the PW Task

The effect of card type on reaction time was analyzed using a within group repeated measures ANOVA. Consistent with prior research, participants took longer to respond to cards with distracter stimuli (de Zubizaray et al., 2001; Friedman & Miyake, 2004). For the adult sample, there was a significant difference among the response time on all 4 cards [Wilks' Lambda = .31, $F(3, 81) = 59.16$, $p < .001$, multivariate partial eta squared = .69], and between the incongruent distracter card and control card [Wilks' Lambda = .40, $F(1, 83) = 124.38$, $p < .001$, multivariate partial eta squared = .60], indicating that all participants took longer to respond when distracter stimuli were present. Adult participants were significantly faster on the control card ($M = 26.54$; $SD = 23.12$) than on the incongruent distracter card ($M = 33.67$; $SD = 26.48$). Similar results were found with the adolescent sample displaying a significant difference among the response time on all 4 cards [Wilks' Lambda = .36, $F(3, 951) = 56.96$, $p < .001$, multivariate partial eta squared = .64], and between the incongruent distracter card and the control card [Wilks' Lambda = .55, $F(1, 97) = 80.77$, $p < .001$, multivariate partial eta squared = .45]. Adolescent participants were significantly faster on the control card ($M = 22.63$; $SD = 13.40$) than on the incongruent distracter card ($M = 29.21$; $SD = 14.55$).

An independent-samples *t*-test was conducted to compare calculated interference effects for adults and adolescents. There was no significant difference in interference effect between groups, however the adults ($M = 7.13$, $SD = 5.86$) had slightly longer response times as compared to the adolescents [$M = 6.56$, $SD = 6.81$; $t(180) = -.60$, $p = .55$]. The magnitude of the difference in the means was small ($d = .09$). In summary, an interference effect was present for both the adult and adolescent samples, however, there was *no* significant difference in interference effect between groups.

Associations among Psychopathy Scales and Subscales

Tables 3 and 4 report the means, standard deviations, range, and bivariate correlations among measures of psychopathy and anxiety for the adult and adolescent samples. As expected, significant positive correlations emerged between the subscales and total score of the PCL-R/YV, PPI, and YPI. Furthermore, as expected, factors/facets on the different measure of psychopathy assessing similar traits were only moderately positively correlated indicating that each factor/facet taps slightly different but overlapping constructs. For example, the fearless dominance (FD) factor of the PPI was significantly correlated with the interpersonal facet of the PCL-R ($r = .23$, $p < .05$) but also associated with the affective facet, although only at a trend level of significance ($r = .21$, $p = .06$).

Aim 1: What is the Relationship between Specific Psychopathy Traits and Response Modulation Deficits among Adults?

Main effects for adults. As shown in Tables 3, the PCL-R affective facet displayed a statistically significant inverse zero-order correlation with picture word (PW) interference. Similarly, the PPI Total and Coldheartedness (CH) subscale were weakly inversely associated

with PW interference. This suggests that affective features of psychopathy may weakly relate to response modulation deficits for adults.

There were no other significant correlations between the measures of psychopathy, PW interference, or anxiety. However, statistical power in this study was likely limited due to small sample sizes ($n = 98$ for adolescents; $n = 84$ for adults) and the typically small-medium effect sizes for response modulation found in prior studies (Hiatt et al., 2004; Vitale et al., 2005). For that reason, interpretation focuses on effect sizes.

Next, to assess the independent association between each psychopathy trait dimensions and PW interference, semi-partial correlations were used to adjust for other psychopathy subscales within a measure. Table 5 reports the semi-partial correlations between the measures of psychopathy and the interference effect of the PW task. For adults, the PCL-R Affective facet and PPI Coldheartedness (CH) remained moderately associated with reduced PW interference. This strengthens earlier suggestions that affective features of psychopathy relate to response modulation deficits among adults.

Interactions of psychopathy traits among adults. To assess whether psychopathy trait dimensions interact or work together to predict response modulation performance, a series of Ordinary Least Squares (OLS) multiple regressions were conducted. Using a hierarchical variable entry strategy, the main effects of the dimensions were entered at step 1 and interactions among the subscales were entered at step 2. A hierarchical variable entry strategy was chosen over stepwise entry because of the controversy regarding the use of stepwise procedures (Tabachnick & Fidell, 2007). Stepwise entry of variables into a regression equation can omit variables based solely on statistical criteria and are generally used when the only aim is a prediction. Furthermore, sample sizes should be large when using stepwise techniques

(Tabachnick & Fidell, 2007). Because of the relatively sample size and the interest in focused hypotheses about both individual and interaction effects, a hierarchical variable entry strategy was utilized.

Table 6 displays the R^2 , ΔR^2 , and standardized regression coefficients across the four measures of psychopathy: the PCL-R and PPI for adult participants and the PCL-YV and YPI for adolescent participants (adolescents will be discussed separately below). Main effects for adults were similar to those observed for semi-partial correlations above. Examination of the ΔR^2 indicates a moderate effect size for the main effects across the adult measures (.07 for the PCL-R and .08 for the PPI). For adults, interactions between subscales did not significantly predict PW performance for either measure. Although only one interaction is reported in Table 6 (e.g. PCL-R interpersonal by PCL-R Affective, PPI-FD by PPI-SI), all combinations of factor interactions were analyzed in multiple models and none significantly predicted task performance.

In addition, interaction effects between anxiety and psychopathy total scores were examined to allow for comparison with prior research which demonstrated an association between response modulation deficits and high psychopathy total scores coupled with low anxiety (Hiatt et al., 2004; Vitale et al., 2005). As with the previous analyses, no significant interaction for psychopathy total score and anxiety were observed for either age group (see Table 7).

Summary, Aim 1. Counter to the hypothesis that externalizing traits would relate to decreased PW interference (indicating a response modulation deficit), the present study found that the Affective facet of the PCL-R and PPI Coldheartedness independently related to these deficits among adults. This suggests that relatively specific psychopathic traits relate to response modulation deficits among adults when measured using the PW task.

Aim 2: Is The Relation between Psychopathy Traits and Response Modulation Deficits Similar among Adolescents?

Main effects for adolescents. As shown in Table 4, the PCL:YV Antisocial facet was significantly positively correlated with PW interference. Similarly, the YPI Lifestyle factor was positively related (though weakly) to PW interference. This suggests that, if anything, that factors/facets that assess social deviance (e.g. externalizing) are not specific to psychopathy and may relate to response *interference* effects for youth.

When controlling for the effect of the other factors/facets of the psychopathy measures, there was a trend for the YPI Interpersonal factor to be associated with reduced PW interference, indicating a response modulation deficit (see Table 5). This is partially consistent with the observations among adults. However, in contrast to adults, the Antisocial facet of the PCL-YV and to a lesser extent the Lifestyle factor of the YPI were associated with *increased* PW interference. In other words, as externalizing traits increased, so did interference on the PW task, indicating a greater interference from peripheral cues.

Interactions of psychopathy traits among adolescents. As observed in the adult sample, addition of the interaction between the traits of the PCL-YV or the YPI did not significantly predict PW performance among adolescents (again, Table 6 only presents the interaction between the two traits, however, all combinations of interactions between factors/facets were tested). Together, these results indicate that traits of psychopathy do not interact for either adults or adolescents to predict PW performance. Instead, as outlined earlier, there are somewhat different main effects for psychopathy dimensions, as a function of age group.

Supplemental aim: exploring the influence of ethnicity on results. Newman et al. (1997) found that Black inmates with high psychopathy scores coupled with low anxiety did *not* manifest the same response modulation deficits as their White counterparts. Because the present study had a greater proportion of African Americans in the adult sample as compared to the adolescent sample, supplemental analyses were conducted to explore whether the age-group related differences observed in the association between psychopathy traits and response modulation deficits were partially attributable to ethnic differences.

The adult and adolescent samples were sub-divided into non-Caucasian and Caucasian groups. First, within the adult and adolescent samples, there were no significant differences between Caucasian and non-Caucasian groups in their performance on the PW task, $t(96) = .31, ns$ for adolescents; $t(82) = -1.67, p < .10$ for adults. Nevertheless, there was a non-significant trend for adult Caucasians to display *less* interference ($M = 5.50, SD = 4.57$) than the non-Caucasian subgroup ($M = 7.82, SD = 6.23$). Second, as shown in Table 8, there were differences in the relationship between psychopathy traits and PW performance by ethnicity. The associations observed at the group level predominantly reflect those for non-Caucasian. Most striking for the adolescent group is that the YPI Interpersonal factor was significantly associated with response modulation deficits for the non-Caucasian subgroup, but not the Caucasian subgroup.

Although there are differences within group level, it does not appear that ethnicity is solely driving the differences observed between age groups. Within the Caucasian sample, the antisocial traits (i.e. externalizing) of the PCL still emerged as positively associated with *greater* interference for the adolescent sample but not for the adult sample. Furthermore, the Coldheartedness subscale of the PPI and the Affective facet of the PCL-R were strongly

inversely correlated with PW interference among Caucasian adult but not with Caucasian adolescents. Only a weak inverse correlation on the Lifestyle facet of the PCL-YV emerged for Caucasian adolescents. These findings suggest that externalizing features are more prominently related to greater interference among adolescents.

Summary, Aim 2. For youth, interpersonal features related weakly and non-significantly to response modulation deficits. However, in contrast with adults, externalizing traits independently predicted longer response times on the PW task for youth, indicating unusually pronounced interference effects. The supplemental analyses separating groups into non-Caucasian and Caucasian subgroups indicated that antisocial features were still more prominently related to *greater* interference among adolescents as compared to adults. This suggests that ethnicity does not account for the observed differences among adolescent and adults.

DISCUSSION

This study is among the first to use multi-method measures of psychopathy (i.e. PCL-R/YV, PPI-SF, and YPI) to assess the relation between psychopathy traits and response modulation across adult and adolescent samples. Specific emphasis was placed on exploring whether these relationships differed for adults and adolescents, given (a) the tension over the appropriateness of assessing psychopathy among youth (Edens et al., 2001; Seagrave & Grisso, 2002, Skeem et al., 2011) and (b) that adolescents are still developing cognitive control (Casey et al., 1997; Ladouceur et al., 2007). The main findings may be organized into two points. First, contrary to our hypothesis, the PCL-R Affective facet and PPI Coldheartedness predicted reduced interference among adults. That is, core affective features of psychopathy among adults (not general externalizing) were associated with response modulation deficits. Second, these specific psychopathic features play less of a role in response modulation for adolescents. For adolescents, YPI Interpersonal features weakly predicted reduced interference (at a trend level of significance). In contrast, the PCL:YV Antisocial facet and YPI Lifestyle features (at a trend level of significance) predicted *greater* interference from peripheral stimuli. In other words, the externalizing traits of psychopathy were associated with *enhanced* response modulation. Although this is only one study, it raises questions about (a) the generalizability of response modulation underscoring psychopathy across developmental phases and (b) whether psychopathy measures are identifying the same group across ages.

The study's limitations must be considered before interpreting these findings. First, chronological age (i.e., 14-17 years or 24-29 years) was used to operationalize developmental stage. However, it is possible that individuals in the same age category varied in their developmental stage which may have confounded the results (Petersen, 1988). Future research

should include measures that more sensitively assess developmental stage to disaggregate groups for comparison. Second, there was a one-year delay between psychopathy assessments and response modulation tests, which likely attenuated relationships between the two. Cauffman, Skeem, and Dmitrieva (under review) have demonstrated that among adolescents, small but significant changes to PCL-YV Affective and Lifestyle factors scores can occur over a one to two year period.

Finally, and most importantly, it is unclear what specific cognitive processes are used when completing the PW task (Dell'Acqua, Job, Peressotti, & Pascali, 2007; de Zubicaray et al., 2001). On the one hand, some theorists argue that the distracter stimuli cause an interference effect during information encoding, an early attentional processing phase (Dell'Acqua et al., 2007; Hiatt et al., 2004; van Maanen, van Rijn, & Borst, 2009). On the other hand, some theorists contend that the interference effect occurs during the response selection or execution phase, which are later attentional processing phases (Schnur & Martin, 2011). Still others posit an interactive model in which the interference effect is spread across both the encoding and retrieval stages (early and late processing; de Zubicaray et al., 2001). Clearly identifying which stages of processing is used during the PW task is important as some theorists contend that observed response modulation deficits occur during difference processing stages for core psychopathy traits and externalizing traits (Baskin-Sommers & Newman, 2013). How these processing differences could influence the results will be discussed in greater detail in the following section.

Comparing Results with Past, Similar Research on the PW Interference Task

Only two past studies have examined the relation between measures of psychopathy and response modulation, as assessed with the PW task. Neither study examined the relations

between specific underlying traits of psychopathy and response modulation. Instead, the focus was on how high psychopathy total scores combined with low anxiety related to PW performance.

First, Hiatt et al. (2004) found that high total PCL-R scores coupled with low anxiety were associated with reduced interference on the PW task among adults (see also Newman, et al., 1997; Patterson & Newman, 1993). Similarly, among adolescents, Vitale et al. (2005) found that high ASPD total scores with low anxiety displayed reduced interference on the PW task. We could not replicate either of these effects in the current study – total scores on the measures of psychopathy did not interact with total scores on the measures of anxiety to predict reduced interference on the PW task.

Although the current sample was more ethnically diverse than previous studies, ethnic differences did not account for the lack of consistency with prior findings using the PW task. Both Hiatt et al. (2004) and Vitale et al. (2005) samples was exclusively Caucasian, whereas the majority of the present study's samples (both adult and adolescent) were non-Caucasian. Past research suggests that the association between psychopathy and response modulation deficits does not generalize to non-Caucasian samples (Newman et al., 1997). In the present study, however, among the non-Caucasian adult sample, the core affective features (PCL-R Affective facet at a trend level of significance) were associated with *reduced* interference on the PW task, suggesting the presence of deficits in response modulation. Comparatively, the adolescent non-Caucasian sample in the current study displayed an association with the Interpersonal factor of the YPI (and to a lesser extent the PCL-YV Affective facet) and response modulation deficits (i.e. *less* interference) but also displayed *greater* interference from the disinhibition features of psychopathy (a trend level for the YPI Lifestyle and PCL-YV Antisocial). These results suggest

that lack of association of psychopathy total scores with response modulation deficits is not accounted for by ethnic differences.

One possible explanation for the more striking difference between the current study's findings on the adolescent sample and Vitale et al. (2005) findings may be the difference in age ranges. Vitale and colleagues sample was limited to 16 year olds whereas the current adolescent sample ranged from 14-17. Recall that Ladouceur et al. (2007) found that earlier versus later adolescent groups differ in their performance on tasks that are influenced by cognitive control and disinhibition. Specifically the early adolescent group displayed poorer performance on a flanker discrimination task as compared to the late adolescent group. For Ladouceur and colleagues, the early adolescent group age ranged from approximately 9-14 whereas the late adolescent group ranged from over 14-19. Because the current sample included a lower age range (including 14 year-olds) the still developing cognitive processes could have played more of an influence in performance on the PW task.

Affective Traits Independently Predicts Response Modulation Deficits in Adults

Although an association with psychopathy total score was not found, the results of the present study for adults are *conceptually* consistent with past research using the PW task, in the sense that affective features of psychopathy (i.e. PCL-R Affective facet and PPI Coldheartedness) independently predicted response modulation deficits among adults. Although the PCL-R Affective facet and PPI Coldheartedness both assess affective features, these factors were only moderately correlated in the current sample ($r = .24, p < .05$) and do not assess identical traits. Coldheartedness reflects a lack of reactivity to the distress of others, sentiment, and imagination (Benning et al., 2003), whereas the Affective facet of the PCL-R represents a deficient affective experience, callousness, and failure to accept responsibility (Hare et al.,

1990). These findings provide evidence that the shared feature of lack of emotional reactivity may be underpinned by response modulation deficits, as measured by the PW task. This is consistent with the spirit of Newman's hypothesis that response modulation deficits are specific to psychopathy.

There was little to no support for the hypothesis that externalizing traits would predict response modulation deficits among adults. This is in contrast to proposals suggesting that externalizing traits are related to attentional deficits (Patrick & Bernat, 2009) and prior research demonstrating that externalizing traits are associated with deficits in response modulation (Heritage & Benning, 2012; Molto et al., 2007). These contradictory findings may be a reflection of using the PW task as an index of response modulation. Recall that it remains unclear which stage of information processing is involved during the PW task (Dell'Acqua et al., 2007; de Zubicaray et al., 2001). Much of the research that links externalizing traits with reduced attention focuses on ERN amplitude (Hall, et al., 2007; Heritage & Benning, 2012; Patrick & Bernat, 2009) and ERN, as it is generally measured, is involved in later stages of attentional processing (for a review see Yeung et al., 2004). If the PW task only taps *early* information processing stages, such as information encoding, and is less sensitive to *later* information processing stages, such as response selection and execution, then it could explain the lack of association between externalizing traits and performance on the PW task for adults.

Core Features of Psychopathy Play Less of a Role in Response Modulation among Adolescents than Externalizing Traits

Adolescents' pattern of associations between traits of psychopathy and performance on the PW task differed from those of adults. The one area of close similarity with the adults lies with the association between interpersonal features of psychopathy (as assessed with the YPI)

and response modulation deficits. The Interpersonal subscale of the YPI displayed a trend significant association with *reduced* PW interference. However, this association was driven by the non-Caucasian adolescent sample. The non-Caucasian sample displayed a strong inverse association between the YPI Interpersonal factor and PW interference, indicating the presence of response modulation deficits, whereas the Caucasian sample displayed no association. This is in contrast to prior research with adults suggesting that response modulation deficits do not generalize to non-Caucasian samples (Newman et al., 1997). Although the YPI Interpersonal scale taps features, such as dishonest charm and manipulation, that are separate from the PCL-R affective factor, both are considered to tap more core psychopathy features (Cooke, Michie, Hart, & Clark, 2004; Skeem & Cooke, 2010; Skeem et al., 2011). This suggests that the core features of psychopathy play more of a role in observed response modulation deficits for non-Caucasian adolescents but not for their Caucasian counterparts.

Additionally, the externalizing and disinhibition traits of psychopathy uniquely predicted *greater* interference on the PW task. Both the Antisocial facet of the PCL-YV and the YPI Lifestyle (at a trend level) subscale were associated with greater interference on the PW task (i.e. enhanced response modulation). Because the Lifestyle dimension does not include items assessing antisocial behavior, it can be seen as a cleaner measure of disinhibition, whereas the PCL-YV Antisocial facet may be tapping more externalizing behavior. The association of greater interference on the PW task with externalizing and disinhibition traits observed among adolescents may be an indication of difficulty maintaining focus, which is consistent with prior research demonstrating that cognitive processes influencing disinhibition are still developing in adolescent (Casey et al., 1997; Ladouceur et al., 2007).

For example, Ladouceur et al. (2007) demonstrated that attenuated ERN amplitude (i.e. reduced conflict monitoring) did not translate into faster response times on a flanker discrimination tasks, which has been posited to index response modulation (Zeier, Baskin-Sommers, Hiatt Racer, & Newman, 2012). Among adults, greater ERN amplitude actually predicted faster response times on a flanker task. In other words, increased processing of secondary cues was associated with faster task performance. According to the authors, ERN may play a role in cognitive control processes and increased conflict monitoring may allow one to more efficiently process stimuli as the task progresses, resulting in faster response times. Thus, the longer response time on the PW task associated with externalizing and disinhibition traits could reflect poorer cognitive control processing, however, this remains speculative. What is clear is that although core psychopathy traits are associated with response modulation deficits for adults, core traits play less of a role during adolescents. Instead externalizing features underpin *enhanced* response modulation during adolescence.

Conclusions and Future Directions

In conclusion, the results of this study suggest that dimensions of psychopathy may relate differently to response modulation, as a function of age. For adults, affective traits predicted response modulation deficits. For adolescents, externalizing and disinhibition traits predicted *pronounced* response modulation.

The results of the present study are only partially consistent with those of past research which may be a function of the task employed to assess response modulation. Unfortunately the inconsistency appears to be the norm when researching the underlying deficits that contribute to psychopathic behavior. Findings, even from neuroscientific research, appear to be all over the map (for a review see Patrick, Venables, & Skeem, 2012). What has been lacking is a clear

understanding of what tasks used to assess response modulation are actually measuring. It may be that the parameters of the task utilized moderate the relationship between performance and psychopathy traits (Patrick et al., 2012). Future research needs to include well established psychophysiological markers of attention (Miltner, Braun, & Coles, 1997; Patrick & Bernat, 2010) to help disentangle the sequence of cognitive processing during response modulation tasks. Furthermore, to clarify some of the inconsistencies observed, future research needs to incorporate many of the existing measures of response modulation within the same sample.

Despite some of the inconsistencies with past research, these results provide additional support that psychopathy is difficult and/or inappropriate to assess during adolescence. Psychopathy assessments among youth are often used to determine treatment, sentencing decisions, and if youth should be tried in adult court (Skeem et al., 2011). These legal decisions have lasting and marked implications and researchers need to be clear that the tools used to assess psychopathy among youth are (a) appropriate and (b) identifying traits that will persist into adulthood. It is hoped that the current study will spark more research testing the important possibility that developmental features of adolescence mask or potentially moderate the relation between core dimensions of psychopathy and response modulation. Ideally, future research will include longitudinal studies with multiple measures of psychopathy, development, and response modulation.

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Table 1

Description of Items Comprising Factors/Facets for Psychopathy Measures

PCL-R four facet model	PPI three factor model	PCL-YV four facet model	YPI three factor model
Interpersonal	Fearless Dominance (FD)	Interpersonal	Interpersonal
Glib/superficial charm	Stress immunity	Impression management	Dishonest charm
Grandiosity	Social potency	Grandiosity	Grandiosity
Pathological lying	Fearlessness	Pathological lying	Lying
Conning/manipulative	Self-Centered Impulsivity (SI)	Manipulation for personal gain	Manipulation
Affective	Machiavellian egocentricity	Affective	Affective
Lack of remorse	Impulsive nonconformity	Lack of remorse	Lack of remorse
Shallow affect	Blame externalization	Shallow affect	Lack of emotion
Callous/lacking empathy	Carefree nonplanfulness	Callous/lacking empathy	Callousness
Failure to accept responsibility	Coldheartedness (CH)	Failure to accept responsibility	Lifestyle
Lifestyle		Lifestyle	Sensation seeking
Stimulation seeking		Stimulation seeking	Impulsivity
Parasitic lifestyle		Parasitic orientation	Irresponsibility
Lacks goals		Lacks goals	
Impulsivity		Impulsivity	
Irresponsibility		Irresponsibility	
Antisocial		Antisocial	
Poor behavioral controls		Poor anger control	
Early behavior problems		Early behavior problems	
Juvenile delinquency		Juvenile delinquency	
Revocation of release		Revocation of release	
Criminal versatility		Criminal versatility	

Note. PCL-R = Psychopathy Checklist Revised; PPI = Psychopathic Personality Inventory-Short Form; PCL-YV = Psychopathy Checklist-Youth Version; YPI = Youth Psychopathic Traits Inventory. Adapted from "Factor Structure of the Hare Psychopathy Checklist: Youth Version (PCL:YV) in Incarcerated Adolescents", by C. Neuman, D. Kosson, A. Forth, and R. Hare, 2006, *Psychological Assessment*, 18, p. 144.

Table 2

Comparison of Characteristics of the Adult and Adolescent Samples

Characteristic	Adult (<i>n</i> = 84)	Adolescent (<i>n</i> = 98)	Effect Size
Ethnicity ^a (%)			.04
African American	53.6	36.7	
Caucasian	29.8	37.8	
Hispanic/Latino	8.3	13.3	
Mean age at baseline	27.50 (1.16)	15.69 (0.91)	
Mean number of prior offenses ^b	5.12 (3.73)	3.40 (2.66)	.55†
Type of current offense ^a (%)			.27*
Procedural	6.6	37.6	
Violent	73.7	28.0	
Property	3.6	14.0	
Drug	15.8	12.9	
Mean IQ score ^b	88.34 (12.66)	87.94 (13.62)	.03

Note. Standard deviations are in parentheses. IQ = Wechsler Abbreviated Scale of Intelligence score.

^a Φ^2 reported for chi-square analyses. ^b Cohen's *d* reported for *t*-test analyses.

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 3

Distributions of and Correlations among PW Interference, Psychopathy, and Anxiety for Adults

	1	2	3	4	5	6	7	8	9	10	11
1. PW Interference	-										
2. PCL-R Total	-.16	-									
3. PCL-R Interpersonal	-.07	.81**	-								
4. PCL-R Affective	-.23*	.78**	.51**	-							
5. PCL-R Lifestyle	.02	.63**	.22*	.25*	-						
6. PCL-R Antisocial	.05	.37**	.20†	.27*	.39**	-					
7. PPI Total	-.20†	.20†	.05	.20†	.26*	.25*	-				
8. PPI-FD	.00	.20†	.23*	.21†	.03	.15	.34**	-			
9. PPI-SI	-.13	.00	-.15	-.04	.21†	.15	.73**	-.31**	-		
10. PPI-CH	-.21†	.20†	.10	.24*	.14	.03	.42**	-.13	.18†	-	
11. Anxiety	.02	-.04	-.04	-.15	.07	.09	.20	-.41**	.54**	.02	-
Mean (SD)	7.13 (5.86)	16.10 (4.42)	4.54 (2.24)	4.79 (1.85)	6.82 (1.84)	6.23 (1.89)	133.57 (10.88)	57.92 (7.13)	61.12 (9.42)	14.50 (3.78)	40.45 (9.67)
Range	-5-24	5-23	0-8	0-8	2-10	1-10	114- 159	47-73	42-85	7-25	24-64

Note. PW = Picture-Word task; PCL-R = Psychopathy Checklist – Revised; PPI = Psychopathic Personality Inventory-Short Form; FD = Fearless Dominance; SI = Self-Centered Impulsivity; CH = Coldheartedness; Anxiety = State-Trait Anxiety Inventory, Trait score only.

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 4

Distributions of and Correlations among PW interference, Psychopathy, and Anxiety for Adolescents

	1	2	3	4	5	6	7	8	9	10	11
1. PW Interference	-										
2. PCL-YV Total	-.06	-									
3. PCL-YV Interpersonal	-.04	.75**	-								
4. PCL-YV Affective	-.04	.76**	.31**	-							
5. PCL-YV Lifestyle	-.05	.70**	.26*	.38**	-						
6. PCL-YV Antisocial	.31**	.42**	.37**	.29**	.26**	-					
7. YPI Total	.00	.30**	.26*	.22*	.17	.18†	-				
8. YPI-Interpersonal	-.07	.31**	.32**	.19†	.15	.14	.92**	-			
9. YPI-Affective	.03	.15	.08	.19†	.07	.21*	.70**	.46**	-		
10. YPI-Lifestyle	.10	.24*	.15	.19†	.22*	.13	.81**	.65**	.43**	-	
11. Anxiety	.05	-.09	.00	-.09	-.13	-.11	.06	.11	-.09	.14	-
Mean (SD)	6.56 (6.81)	16.21 (4.07)	4.48 (2.05)	4.80 (1.87)	6.94 (1.60)	8.30 (1.70)	123.78 (25.21)	45.88 (12.80)	36.85 (8.17)	42.28 (8.40)	13.73 (6.66)
Range	-15- 28	8-26	0-8	1-8	3-10	4-10	65-180	20-75	19-60	16-60	0-28

Note. PW = Picture-Word task; PCL-YV = Psychopathy Checklist – Youth Version; YPI = Youth Psychopathic Traits Inventory; Anxiety = Revised Children's Manifest Anxiety Scale Total score.

* $p < .05$. ** $p < .01$.

Table 5
*Semi-Partial Correlations between PW Interference
and Psychopathy Measures*

Adult measures	PW interference
PCL-R Interpersonal	.05
PCL-R Affective	-.25*
PCL-R Lifestyle	.04
PCL-R Antisocial	.10
PPI-FD	-.06
PPI-SI	-.10
PPI-CH	-.24*
Adolescent measures	
PCL-YV Interpersonal	-.12
PCL-YV Affective	-.07
PCL-YV Lifestyle	-.08
PCL-YV Antisocial	.37**
YPI-Interpersonal	-.17†
YPI-Affective	.03
YPI-Lifestyle	.18†

Note. Semi-partial correlations were corrected for the subscales of the same instrument. PW = Picture-Word task; PCL-R = Psychopathy Checklist – Revised; PCL-YV = Psychopathy Checklist – Youth Version; PPI = Psychopathic Personality Inventory-Short Form; FD = Fearless Dominance; SI = Self-Centered Impulsivity; CH = Coldheartedness; YPI = Youth Psychopathic Traits Inventory.

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 6

Multiple Regression Analyses Predicting PW Performance from Traits of Psychopathy Measures among Adults and Adolescents

Predictor	Adult Psychopathy Measures				Adolescent Psychopathy Measures			
	PCL-R (<i>n</i> = 84)		PPI-SF (<i>n</i> = 83)		PCL-YV (<i>n</i> = 96)		YPI (<i>n</i> = 97)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.07		.07		.14		.04	
PCL-Interpersonal/PPI-FD/YPI-Interpersonal		.05		-.06		-.14		-.23†
PCL-Affective/PPI-SI/YPI-Affective		-.30*		-.10		-.08		.03
PCL-Lifestyle/PPI-CH/YPI-Lifestyle		.05		-.24*		-.09		.23†
PCL-Antisocial		.11				.41**		
Step 2	.00		.01		.01		.01	
PCL-Interpersonal/PPI-FD/YPI-Interpersonal		.06		-.09		-.15		-.26†
PCL-Affective/PPI-SI/YPI-Affective		-.31*		-.11		-.08		.05
PCL-Lifestyle/PPI-CH/YPI-Lifestyle		.05		-.25*		-.10		.23†
PCL-Antisocial		.10				.41**		
Interpersonal x Affective/FD x SI		-.04		.09		.12		-.12
<i>R</i> ²	.07		.08		.15		.05	

Note. PCL-R = Psychopathy Checklist Revised; PPI = Psychopathic Personality Inventory-Short Form; PCL-YV = Psychopathy Checklist-Youth Version; YPI = Youth Psychopathic Traits Inventory. FD = Fearless Dominance; SI = Self-Centered Impulsivity; CH = Coldheartedness.

†*p* < .10. **p* < .05. ***p* < .01.

Table 7

Hierarchical Multiple Regression Analyses with Psychopathy Total Scores and Anxiety for Adults and Adolescents

Predictor	Psychopathy Measure			
	Adult PCL-R		Adolescent PCL-YV	
	(n = 84)		(n = 96)	
	ΔR^2	β	ΔR^2	β
Step 1	.00		.01	
Anxiety		-.04		.06
Psychopathy Total Score		.02		.07
Step 2	.00		.01	
Anxiety		-.07		.06
Psychopathy Total Score		.02		.07
Psychopathy \times Anxiety		-.06		-.12
R^2	.07		.02	

Note. PCL-R = Psychopathy Checklist – Revised; PCL-YV = Psychopathy Checklist-Youth Version; Anxiety = State-Trait Anxiety Inventory for adults, Revised Children’s Manifest Anxiety Scale Total score for adolescents.

Table 8

*Semi-Partial Correlations between PW Interference and
Psychopathy Measures for Non-Caucasian and Caucasian*

	PW interference	
	Non-Caucasian (<i>n</i> = 58)	Caucasian (<i>n</i> = 25)
Adult measures		
PCL-R Interpersonal	-.05	.40*
PCL-R Affective	-.21†	-.49*
PCL-R Lifestyle	.11	.00
PCL-R Antisocial	.14	-.06
PPI-FD	-.07	-.04
PPI-SI	-.11	.10
PPI-CH	-.14	-.45*
Adolescent measures	(<i>n</i> = 60)	(<i>n</i> = 37)
PCL-YV Interpersonal	-.12	-.11
PCL-YV Affective	-.19†	-.02
PCL-YV Lifestyle	.03	-.18†
PCL-YV Antisocial	.21†	.52**
YPI-Interpersonal	-.30*	.03
YPI-Affective	.07	.01
YPI-Lifestyle	.23†	.08

Note. Semi-partial correlations were corrected for the subscales of the same instrument. PW = Picture-Word task; PCL-R = Psychopathy Checklist Revised; PCL-YV = Psychopathy Checklist-Youth Version; PPI = Psychopathic Personality Inventory-Short Form; FD = Fearless Dominance; SI = Self-Centered Impulsivity; CH = Coldheartedness.

† $p < .10$. * $p < .05$. ** $p < .01$.