



## Dimensions of impulsivity related to psychopathic traits and homicidal behavior among incarcerated male youth offenders

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### ABSTRACT

Despite impulsivity being included as scoring criteria within several measures of youth psychopathic traits, the relationship between psychopathic traits and dimensions of impulsivity among high-risk youth is not well-understood. Here we assessed psychopathic traits via total, factor, and facet scores from the Psychopathy Checklist: Youth Version (PCL:YV) and impulsivity through total, three-factor, and six-factor model scores from the Barratt Impulsiveness Scale (BIS-11) in incarcerated male youth offenders. Correlational analyses indicated PCL:YV total, Factor 2, Facet 3, and Facet 4 scores were significantly positively correlated with BIS-11 total scores. Additionally, psychopathy scores were significantly positively correlated with specific scores from the three-factor model of the BIS-11 (e.g. Motor and Non-Planning Impulsivity scores) and the six-factor model of the BIS-11 (e.g., Attention, Self-Control, and Cognitive Complexity Impulsivity scores). Secondary analyses suggest that participants who had previously committed homicide scored higher on lifestyle/antisocial psychopathic traits and specific dimensions of impulsivity (e.g., BIS-11 Non-Planning and Self-Control Impulsivity factor scores) compared to youth who had not previously committed homicide. Our results improve our understanding of the specific forms of impulsivity significantly correlated with youth psychopathic traits and how specific factors underlying both constructs potentially characterize youth associated with severe forms of antisocial behavior.

### 1. Introduction

Impulsivity is a multi-faceted construct. Individuals characterized by higher impulsivity exhibit deficits in distinct realms, including attentional deficits (e.g., attention/concentration difficulties), motor impulsivity deficits (e.g., the tendency to act without thinking), and non-planning impulsivity deficits (e.g., measuring one's concern with events occurring now compared to those occurring in the future; Patton et al., 1995). Various populations are characterized by heightened impulsivity (Stanford et al., 2009), including youth with elevated psychopathic traits. However, despite being included as scoring criteria within several measures of youth psychopathic traits (Andershed et al., 2002; Frick and Hare, 2001; Forth et al., 2003; Lynam et al., 1997), the relationship between these two constructs is not well-understood.

Impulsivity may be a particularly challenging item to score for youth being assessed on psychopathic traits. For example, impulsivity

represents a normative feature of typical adolescent development (d'Acremont and Van der Linden, 2005), and as such, it may be challenging to differentiate between normative, developmental impulsivity, and impulsivity associated with at-risk youth. Supporting this notion, impulsivity is an item that is typically given a high score when assessing youth for psychopathic traits, even among youth who would otherwise score low on measures of impulsivity (Schrum and Salekin, 2006; Tsang et al., 2015). Improving our understanding of how impulsivity manifests in youth with psychopathic traits may be particularly beneficial, as lifestyle/behavioral psychopathic traits, including impulsivity, have been associated with high-risk outcomes, including recidivism (Sitney et al., 2016) and have also predicted psychopathy scores later in life (Frick et al., 2003).

To date, only a few studies have investigated the relationship between impulsivity and youth psychopathic traits. Campbell et al. (2009) observed that higher scores on the self-report Youth Psychopathic Traits

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Inventory (YPI; Andershed et al., 2002) were significantly positively correlated with scores on the self-report Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995). Specifically, YPI total scores, as well as grandiose-manipulative and impulsive-irresponsible factor scores, were significantly positively correlated with BIS-11 total scores, whereas callous-unemotional factor scores were not. Additionally, Melanko et al. (2009) reported that youth scoring high on YPI total and the impulsive-irresponsible factor scored higher on BIS-11 total scores compared to youth scoring lower on the YPI. Finally, Verschuere et al. (2012) observed that scores on a modified version of the self-report Child Psychopathy Scale (CPS; Lynam et al., 1997), particularly lifestyle factor scores, were significantly positively correlated with all three factor scores underlying the BIS-11 (e.g., Attentional, Motor, and Non-Planning Impulsivity factor scores). Thus, based on previously performed studies, it appears as if youth psychopathic traits, particularly lifestyle/behavioral psychopathic traits, are significantly correlated with multiple domains of impulsivity. Similar associations have been observed in adults scoring high on psychopathy (Poythress et al., 2010; Snowden and Gray, 2011).

However, previous studies investigating the relationship between youth psychopathic traits and measures of impulsivity suffer from important limitations. For example, Campbell et al. (2009) investigated the association between YPI and BIS-11 scores in a sample of college undergraduates. While participants included in this study were specifically excluded for being over 25 years of age, it remains to be seen if similar findings are observed in younger participants. Furthermore, Verschuere et al. (2012) reported a mean CPS total score of 3.65 in their report; therefore, this previous study investigated the relationship between impulsivity and low psychopathy scores. Thus, it is not clear whether their results extend to samples characterized by higher psychopathy scores.

Here we investigated the relationship between youth psychopathic traits (assessed via the Psychopathy Checklist: Youth Version [PCL:YV; Forth et al., 2003]) and impulsivity (assessed through the BIS-11) in a sample of incarcerated male youth offenders. In addition to BIS-11 total and three-factor model (e.g., Attention, Motor, and Non-Planning Impulsivity) scores, we also incorporated scores from the six-factor model of the BIS-11, whereby scores from the three-factor model are further divided into two additional factors (e.g., Attention and Cognitive Complexity scores underlie the Attentional factor, Motor and Perseverance scores underlie the Motor factor, and Self-Control and Cognitive Complexity scores underlie the Non-Planning Impulsivity factor; Patton et al., 1995). To our knowledge, no study has investigated the relationship between psychopathic traits and scores from the six-factor model of the BIS-11. We specifically hypothesized that specific PCL:YV scores (i.e., lifestyle/behavioral psychopathic traits) would be significantly positively correlated with BIS-11 total scores, Motor and Non-Planning scores from the three-factor model, and Motor, Perseverance, Self-Control, and Cognitive Complexity scores from the six-factor model. We also hypothesized that interpersonal/affective psychopathic traits would not be significantly correlated with BIS-11 scores, consistent with what has been reported in adult samples. By identifying which unique factors of impulsivity are associated with specific psychopathic traits, we hoped to improve our understanding of how impulsivity and psychopathic traits are related among high-risk youth.

Additionally, in secondary analyses performed, we investigated whether youth who previously committed homicide scored higher on the PCL:YV and BIS-11 compared to youth who had not previously committed homicide. Previous studies suggest adults who have previously committed homicide score higher on lifestyle/antisocial psychopathic traits (Cope et al., 2014) and the BIS-11 Non-Planning Impulsivity factor (Sarma et al., 2014) compared to adults who have not previously committed homicide. Thus, in the current study, we hoped to extend upon these previous studies, identifying specific factors underlying both psychopathy and impulsivity that potentially characterize youth who

have committed severe forms of antisocial behavior, including homicide.

## 2. Method

### 2.1. Participants

Our final sample included 208 incarcerated male youth offenders recruited from juvenile correctional facilities, ranging from 14 to 20 years of age ( $M = 17.49$ ,  $SD = 1.20$ ). Extended detail about the recruitment of participants and inclusionary/exclusionary criteria can be found in our Supplemental Materials. Participants self-identified their ethnicity as either Hispanic/Latino ( $n = 119$ ) or non-Hispanic/Latino ( $n = 85$ ); four additional participants chose not to disclose their ethnicity. Participants self-identified their race as either American Indian or Alaskan Native ( $n = 22$ ), Black or African American ( $n = 39$ ), Native Hawaiian or other Pacific Islander ( $n = 1$ ), White ( $n = 111$ ), or more than one race ( $n = 13$ ); an additional 22 participants chose not to disclose their race.

Participants who were 18 years of age or older provided written informed consent. Participants who were under the age of 18 provided written informed assent, and their parent and/or guardian provided written informed consent. Participants were informed that they were allowed to discontinue participating in the study at any point, without consequence. Additionally, consistent with the hourly labor wage of the juvenile correctional facilities, participants received compensation for participating in the study. All research protocols were approved by the Ethical and Independent Review Services and the Office for Human Research Protections.

### 2.2. Assessments

Psychopathic traits were assessed using the PCL:YV (Forth et al., 2003), an expert-administered rating scale, consisting of a semi-structured interview, and review of collateral information, including institutional and medical records. The PCL:YV is composed of 20 different items, each scored on the following rating scale: 0 (*does not apply*), 1 (*applies somewhat*), and 2 (*definitely applies*). PCL:YV total scores can range from 0 to 40; the mean PCL:YV total score for the sample was 24.04 ( $SD = 6.17$ , range: 2–37,  $\alpha = 0.81$ ). We also investigated PCL-R factor and facet scores, with Factor 1 consisting of interpersonal (Facet 1) and affective (Facet 2) psychopathic traits, and Factor 2 measuring lifestyle/behavioral (Facet 3), and antisocial/developmental (Facet 4) psychopathic traits (Neumann et al., 2006).

Impulsivity was assessed via the BIS-11 (Patton et al., 1995), a 30-item self-report measure, with the following scoring options for each item: 1 (*rarely/never*), 2 (*occasionally*), 3 (*often*), and 4 (*almost always/always*). BIS-11 total scores can range from 30 to 120; the mean BIS-11 total score for the sample was 70.68 ( $SD = 10.48$ , range: 41–103,  $\alpha = 0.80$ ). In addition to BIS-11 total scores, we also investigated three-factor model scores (e.g., Attentional, Motor, and Non-Planning Impulsivity scores) and six-factor model scores (e.g., Attention, Cognitive Instability, Motor, Perseverance, Self-Control, and Cognitive Complexity Impulsivity scores).

Additionally, we investigated whether participants included in the current study had previously committed homicide via a self-report measure (Aharoni & Kiehl, 2013), whereby participants were asked to report whether they had committed various types of criminal activity. For the purposes of the current investigation, we incorporated responses from the following categories: murder, attempted murder, and/or manslaughter. Based on participant's responses, 79 participants previously committed at least one of these crimes, whereas 117 participants did not previously commit these crimes. Additionally, 12 participants did not complete this self-report measure and were not included in secondary analyses performed.

### 2.3. Data analysis

First, we investigated the association between PCL:YV total, factor, and facet scores and BIS-11 total, three-factor model, and six-factor model scores via correlational analyses. Additionally, secondary analyses investigated whether youth who had previously committed homicide, attempted homicide, and/or manslaughter, scored higher on PCL:YV and BIS-11 scores compared to youth who had not previously committed these crimes via independent samples *t*-tests. All significant results reported survived a modified Bonferroni multiple comparison correction within each family of statistical tests performed.

## 3. Results

### 3.1. Correlational analyses

As seen in Table 1, BIS-11 total scores were significantly positively correlated with PCL:YV total, Factor 2, Facet 2, Facet 3, and Facet 4 scores. BIS-11 total scores were not significantly correlated with PCL:YV Factor 1 or Facet 1 scores.

Additionally, as reported in Table 2, PCL:YV scores were significantly positively correlated with scores from the BIS-11 three-factor model. Specifically, BIS-11 Motor Impulsivity factor scores were significantly positively correlated with PCL:YV total, Factor 2, and Facet 3 scores. Additionally, BIS-11 Non-Planning Impulsivity factor scores were significantly positively correlated with PCL:YV total, Factor 2, Facet 3, and Facet 4 scores.

PCL:YV scores were also significantly positively correlated with specific scores from the BIS-11 six-factor model, as seen in Table 3. First, BIS-11 Attention factor scores were significantly positively correlated with PCL:YV Factor 2 scores. Additionally, BIS-11 Self-Control factor scores were significantly positively correlated with PCL:YV total, Factor 2, Facet 3, and Facet 4 scores. Finally, BIS-11 Cognitive Complexity factor scores were significantly positively correlated with PCL:YV Facet 3 scores.

Additionally, as impulsivity is an item that is included within the scoring criteria for PCL:YV total, Factor 2, and Facet 3 scores, we performed additional analyses (see our Supplementary Materials), where we rid of item 14 (impulsivity) from PCL:YV total, Factor 2, and Facet 3 scores to avoid criterion overlap between variables investigated. As seen in the Supplementary Materials, these modified results are largely consistent with results reported in the main manuscript.

### 3.2. Independent samples *t*-tests

We performed independent samples *t*-tests to see whether youth who previously committed homicide, attempted homicide, and/or manslaughter and youth who did not previously commit these crimes significantly differed with respect to PCL:YV and BIS-11 scores. As seen in Supplementary Table 1, youth who previously committed extreme forms of antisocial behavior, including homicide, scored higher on PCL:YV total, Factor 2, Facet 3, and Facet 4 compared to those who did not commit these crimes. Additionally, youth who committed extreme forms

of antisocial behavior, including homicide, scored higher on BIS-11 Non-Planning Impulsivity factor scores from the three-factor model, and Self-Control Impulsivity factor scores from the six-factor model, compared to youth who did not previously commit these crimes.

## 4. Discussion

This study investigated the association between psychopathic traits, assessed via total, factor, and facet scores from the PCL:YV (Forth et al., 2003) and impulsivity, measured via total, three-factor, and six-factor model scores from the BIS-11 (Patton et al., 1995) in a sample of incarcerated male youth offenders. Consistent with our hypotheses, psychopathy scores were significantly positively correlated with BIS-11 total scores, Motor and Non-Planning Impulsivity scores from the BIS-11 three-factor model, and Self-Control and Cognitive Complexity scores from the BIS-11 six-factor model. These results are consistent with previously published studies associating higher self-reported psychopathy scores with higher BIS-11 total scores (Campbell et al., 2009; Melanko et al., 2009) and Motor and Non-Planning Impulsivity scores from the three-factor model (Verschuere et al., 2012). However, contrary to hypotheses, PCL:YV scores were not significantly correlated with the Motor and Perseverance factor scores from the BIS-11 six-factor model. Furthermore, contrary to our hypotheses, PCL:YV Factor 2 scores were significantly positively correlated with Attention Impulsivity scores from the BIS-11 six-factor model. The current study helps better delineate the specific forms of impulsivity significantly correlated with youth psychopathic traits.

Additionally, we observed that youth who previously committed homicide, attempted homicide, and/or manslaughter scored higher on PCL:YV Total, Factor 2, Facet 3, and Facet 4 scores, and BIS-11 Non-Planning Impulsivity scores from the three-factor model, and Self-Control Impulsivity scores from the six-factor model, compared to youth who did not previously commit these crimes. These results suggest that the combination of lifestyle/behavioral and antisocial/developmental psychopathic traits along with certain dimensions of impulsivity (e.g., deficits regarding poor self-control) may be especially important in differentiating youth who commit severe forms of antisocial behavior, including homicide, from youth who have not previously engaged in such criminal activity.

Supporting our hypotheses, PCL:YV total, Factor 2, Facet 3, and Facet 4 scores were significantly correlated with BIS-11 Non-Planning Impulsivity scores from the three-factor model. This is consistent with a previous study with adult incarcerated offenders (Snowden and Gray, 2011). Items contained within the BIS-11 Non-Planning Impulsivity factor include item 27: "I am more interested in the present than the future" (Patton et al., 1995). Non-Planning Impulsivity deficits have been measured in previous studies incorporating the balloon analog risk task, whereby youth with elevated psychopathic traits make riskier decisions to receive larger, immediate rewards, compared to making safer decisions and receiving lower sums of money throughout the entirety of the experimental paradigm (Hunt et al., 2005). Non-Planning Impulsivity deficits are also described in original conceptions of psychopathic individuals outlined by Robert Hare and Scott Lilienfeld. Specifically, Hare described psychopathic individuals as "giving little serious thought to the future" (Hare, 2003), and Lilienfeld included items within the Psychopathic Personality Inventory dedicated towards measuring how little individuals with elevated psychopathic traits gave "serious thoughts to their long-term goals" (Lilienfeld and Widows, 2005).

We also observed significant positive correlations between PCL:YV Facet 3 scores and BIS-11 Motor Impulsivity three-factor model scores. These results are consistent with previous studies in both youth (Verschuere et al., 2012) and adults (Snowden and Gray, 2011). Important to note, when performing analyses with scores from the BIS-11 six-factor model, where the BIS-11 Motor Impulsivity factor is further divided into Motor and Perseverance factors, PCL:YV scores were no longer

**Table 1**  
Correlations between BIS-11 total scores and PCL:YV scores.

Variable	PCL:YV Total	PCL:YV Factor 1	PCL:YV Factor 2	PCL:YV Facet 1	PCL:YV Facet 2	PCL:YV Facet 3	PCL:YV Facet 4
BIS-11 Total	<i>r</i> = 0.282 <i>p</i> < .001*	<i>r</i> = 0.168 <i>p</i> = .015	<i>r</i> = 0.333 <i>p</i> < .001*	<i>r</i> = 0.089 <i>p</i> = .202	<i>r</i> = 0.200 <i>p</i> = .004*	<i>r</i> = 0.332 <i>p</i> < .001*	<i>r</i> = 0.244 <i>p</i> < .001*

\*denotes results which survived a modified Bonferroni multiple comparison correction (i.e., 0.05/7, or *p* < .007).

**Table 2**

Correlations between BIS-11 three-factor model scores and PCL:YV scores.

Variable	PCL:YV Total	PCL:YV Factor 1	PCL:YV Factor 2	PCL:YV Facet 1	PCL:YV Facet 2	PCL:YV Facet 3	PCL:YV Facet 4
BIS-11 Attentional Impulsivity	$r = 0.163$ $p = .019$	$r = 0.124$ $p = .075$	$r = 0.187$ $p = .007$	$r = 0.045$ $p = .519$	$r = 0.168$ $p = .015$	$r = 0.151$ $p = .029$	$r = 0.179$ $p = .010$
BIS-11 Motor Impulsivity	$r = 0.214$ $p = .0019^*$	$r = 0.166$ $p = .017$	$r = 0.221$ $p = .001^*$	$r = 0.147$ $p = .034$	$r = 0.136$ $p = .051$	$r = 0.254$ $p < .001^*$	$r = 0.124$ $p = .075$
BIS-11 Non-Planning Impulsivity	$r = 0.266$ $p < .001^*$	$r = 0.099$ $p = .153$	$r = 0.347$ $p < .001^*$	$r = 0.013$ $p = .851$	$r = 0.159$ $p = .022$	$r = 0.343$ $p < .001^*$	$r = 0.255$ $p < .001^*$

\*denotes results which survived a modified Bonferroni multiple comparison correction (i.e., 0.05/21, or  $p < .0024$ ).**Table 3**

Correlations between BIS-11 six-factor model scores and PCL:YV scores.

Variable	PCL:YV Total	PCL:YV Factor 1	PCL:YV Factor 2	PCL:YV Facet 1	PCL:YV Facet 2	PCL:YV Facet 3	PCL:YV Facet 4
BIS-11 Attention	$r = 0.205$ $p = .003$	$r = 0.145$ $p = .037$	$r = 0.238$ $p = .0005^*$	$r = 0.065$ $p = .353$	$r = 0.184$ $p = .008$	$r = 0.207$ $p = .003$	$r = 0.210$ $p = .002$
BIS-11 Cognitive Instability	$r = 0.046$ $p = .512$	$r = 0.049$ $p = .482$	$r = 0.050$ $p = .477$	$r = 0.002$ $p = .975$	$r = 0.083$ $p = .235$	$r = 0.021$ $p = .760$	$r = 0.071$ $p = .306$
BIS-11 Motor	$r = 0.169$ $p = .015$	$r = 0.112$ $p = .108$	$r = 0.192$ $p = .005$	$r = 0.117$ $p = .093$	$r = 0.073$ $p = .292$	$r = 0.208$ $p = .003$	$r = 0.124$ $p = .075$
BIS-11 Perseverance	$r = 0.195$ $p = .005$	$r = 0.183$ $p = .008$	$r = 0.172$ $p = .013$	$r = 0.133$ $p = .055$	$r = 0.180$ $p = .009$	$r = 0.219$ $p = .0014$	$r = 0.070$ $p = .316$
BIS-11 Self-Control	$r = 0.246$ $p = .0003^*$	$r = 0.075$ $p = .281$	$r = 0.339$ $p < .0001^*$	$r = -0.001$ $p = .989$	$r = 0.131$ $p = .059$	$r = 0.325$ $p < .0001^*$	$r = 0.262$ $p < .0001^*$
BIS-11 Cognitive Complexity	$r = 0.191$ $p = .006$	$r = 0.097$ $p = .166$	$r = 0.220$ $p = .0014$	$r = 0.029$ $p = .675$	$r = 0.137$ $p = .048$	$r = 0.234$ $p = .0007^*$	$r = 0.143$ $p = .039$

\*denotes results which survived a modified Bonferroni multiple comparison correction (i.e., 0.05/42, or  $p < .0012$ ).

significantly correlated with these scores. As this is the first study to our knowledge to incorporate BIS-11 six-factor model scores in analyses performed, our results help improve our understanding regarding the specific forms of impulsivity implicated in youth with elevated psychopathic traits. Specifically, it appears as if PCL:YV Facet 3 scores are significantly correlated with the combination of Motor and Perseverance factor scores, rather than when separating these into two distinct factors.

Contrary to hypotheses, when investigating the BIS-11 six-factor model, where the Attentional Impulsivity factor is further divided into Attention and Cognitive Instability scores, PCL:YV Factor 2 scores continued to be significantly correlated with BIS-11 Attention Impulsivity scores, but not Cognitive Instability scores. Previous studies suggest that individuals scoring high on impulsivity perform worse on set-shifting during executive functioning tasks (Cheung et al., 2004). As such, some of the attentional abnormalities, including set-shifting deficits, associated with psychopathic individuals (Anderson et al., 2018) may arise due to important attention-related impulsivity deficits established early in development.

We observed that youth who previously committed homicide, attempted homicide, and/or manslaughter scored higher on certain psychopathy and impulsivity factor scores compared to youth who did not previously commit these crimes. As such, our results support previous studies associating youth who previously committed homicide with higher PCL:YV Factor 2 scores (Cope et al., 2014) and adults who previously committed homicide with higher BIS-11 Non-Planning Impulsivity factor scores (Sarma et al., 2014). Our results also extend upon previous research, as we also found that youth who previously committed extreme acts of antisocial behavior also scored higher on PCL:YV Facet 3 and Facet 4 and BIS-11 Non-Planning Impulsivity scores compared to youth who have not previously committed these crimes. Our results therefore suggest that the combination of certain psychopathic traits and dimensions of impulsivity may be especially important in characterizing youth who are at an increased propensity to engage in severe antisocial behavior, including homicide.

By identifying the specific combination of psychopathic traits and impulsivity associated with deleterious outcomes (e.g., homicide), we may be able to identify youth who may benefit most from specialized treatment intervention approaches. For example, using an intensive

decompression approach, a treatment modality implemented at the Mendota Juvenile Treatment Center has been associated with reduced recidivism rates and psychopathic traits in severely at-risk youth (Caldwell et al., 2007). Furthermore, after participating in this treatment, participants scored lower on the Impulsivity subscale of the Antisocial Process Screening Device (APSD; Frick and Hare, 2001) (Caldwell et al., 2012). Items included within this subscale are similar to those included within the Non-Planning Impulsivity factor of the BIS-11, including item 17: "You do not plan ahead or you leave things until the last minute"). Higher scores on the Non-Planning Impulsivity subscale have been associated with poorer treatment retention (López-Torrecillas et al., 2014) in adults. Therefore, by identifying youth who score high on specific psychopathic traits (e.g., lifestyle/antisocial psychopathic traits) and domains of impulsivity (e.g., Non-Planning Impulsivity), specialized treatment intervention approaches could be implemented to help reduce psychopathic traits, impulsivity, and deleterious outcomes (e.g., homicide) in at-risk youth.

## 5. Limitations

First, we only investigated the relationship between psychopathic traits and impulsivity among incarcerated male offenders. Some have argued that impulsivity is especially important to consider in adolescent girls with psychopathic traits (Tsang et al., 2015). Thus, we cannot state whether our results extend to girls with elevated psychopathic traits. Second, it was surprising that BIS-11 Perseverance Impulsivity scores were not significantly correlated with PCL:YV scores, given how important perseverance deficits are in the characterization of adult psychopathy (Hare, 2003). However, several items contained within this factor may not have been applicable to youth, as they assess one's tendency to change jobs or residences frequently. Younger individuals may not have had these opportunities, instead being reliant upon their parents or caregivers for money and/or shelter. Third, the BIS-11 is dependent upon individual self-report. As pathological lying and conning and manipulative behavior are some of the central features associated with youth scoring high on the PCL:YV (Forth et al., 2003), participants may not have been providing fully accurate information during the administration of self-report measures used in the current



report. Fourth, while we observed statistically significant correlations between psychopathic traits and domains of impulsivity in the current report, our correlations reflected weak to moderate associations overall (i.e.,  $r$  values ranging from 0.20 to 0.35). Finally, it is important to consider our results were obtained via a sample of incarcerated youth offenders. Therefore, it is not known whether our results will extend to non-incarcerated youth who score lower on measures of psychopathic traits.

## Conclusions

We observed that lifestyle/behavioral and antisocial/developmental youth psychopathic traits were significantly positively correlated with certain facets of impulsivity, including Attention Impulsivity, Self-Control deficits, and Cognitive Complexity deficits. However, youth psychopathic traits were not significantly correlated with other forms of impulsivity, including Cognitive Instability deficits, Motor Impulsivity, and Perseverance deficits. Additionally, we observed that youth who previously engaged in severe antisocial behavior, including homicide, scored higher on lifestyle/antisocial psychopathic traits and specific forms of impulsivity (e.g., Non-Planning and Self-Control Impulsivity) compared to youth who did not engage in such criminal activity.

## CRediT authorship contribution statement

**J. Michael Maurer:** Conceptualization, Methodology, Formal analysis, Writing – original draft. **Palmer S. Tirrell:** Formal analysis, Writing – review & editing. **Nathaniel E. Anderson:** Conceptualization, Writing – review & editing. **Samantha N. Rodriguez:** Formal analysis, Writing – review & editing. **Michael F. Caldwell:** Writing – review & editing, Funding acquisition. **Gregory J. Van Rybroek:** Writing – review & editing. **Kent A. Kiehl:** Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition.

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2021.114094](https://doi.org/10.1016/j.psychres.2021.114094).

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