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Exploring Primary and Secondary Variants of Psychopathy in Adolescents in Detention and in the Community

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Abstract

The current study aims to ascertain how different variants of callous–unemotional traits differ in their psychopathology, exposure to aggression and violence, and aggressive and violent behavior. If secondary/distressed variants (high in callous–unemotional traits and high in anxiety) and primary/traditional variants (high in callous–unemotional traits and low in anxiety) differ along these dimensions, it may speak to their different etiologies, treatment needs (e.g., trauma focused), and responsiveness to treatment. The current sample consisted of 799 adolescents from high schools ($n=419$) and juvenile detention centers ($n=380$). Participants were interviewed regarding their callous–unemotional traits, psychopathology, exposure to aggression and violence, and aggressive and violent behavior. Parents/guardians and teachers/staff members also reported on participants' callous–unemotional traits and aggressive and violent behavior. A model-based cluster analysis indicated that there were four clusters in the data set, based on callous–unemotional traits and anxiety: a nonvariant cluster, a primary/traditional callous–unemotional cluster, a secondary/distressed callous–unemotional cluster, and a “fearful” cluster. Secondary/distressed variants of psychopathy exhibited significantly greater symptoms of depression and psychoticism, more exposure to low level aggression and neighborhood violence, and more aggressive and violent behavior, as compared to the other clusters. Adolescents with callous–unemotional traits might not be a homogeneous group, but rather may differ in attitudes, behaviors, and exposure to risk, therefore differing in their treatment needs and responsiveness.

INTRODUCTION

Antisocial behavior is behavior that violates formal laws or informal social norms (Rutter, Giller, & Hagell, 1998; Simcha-Fagen, Langner, Gersten, & Eisenberg, 1975). Research has pointed to a variety of risk factors for the onset and maintenance of antisocial behavior in childhood and through adolescence (e.g., Dodge & Pettit, 2003; Guerra, Williams, Tolan, & Modecki, 2008). Increasingly, scholars examining the development of serious antisocial behavior are considering the role of psychopathic traits (Frick & Marsee, 2005; Kotler & McMahon, 2005; Lynam, 1996). Psychopathy has long been studied as an adult personality disorder characterized by antisocial thoughts, behaviors, and emotions (Cleckley, 1941), but researchers and clinicians now widely recognize the need to consider the early development of psychopathic tendencies, particularly with respect to early emotional socialization (Frick & Morris, 2004). Recent studies of juvenile psychopathy have identified *callous–unemotional traits* as the hallmark of psychopathic tendencies in children and adolescents, as they can be detected early and have shown robust links to antisocial behavior over time (Frick, 2006; Frick & White, 2008).

Psychopathy typically has been viewed as a homogeneous construct, but recent literature has organized it into two broad subtypes: a primary, traditional, or idiopathic subtype, and a secondary, distressed, or symptomatic subtype (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Hare, 2003; Hare et al., 1990; Harpur, Hakstian, & Hare, 1988; Karpman, 1941, 1946, 1948; Porter, 1996). Although they involve similar presentations of psychopathic traits, these subtypes have been theorized to differ in general mental health status and in developmental histories. In this study, we examine a hallmark feature of juvenile psychopathy (i.e., callous–unemotional traits: a lack of guilt, decreased empathy, and the callous use of others for personal gain) in a large sample of high school students ($n=430$) and juvenile delinquents ($n=390$). We investigate whether adolescents classified as *primary* (traditional, idiopathic) or *secondary* (distressed, symptomatic) variants will differ in levels of theoretically specified personal and contextual risk factors.

Primary and Secondary Variants of Psychopathy

Psychopathy comprises two classes of observable features: interpersonal/affective qualities and impulsive/lifestyle characteristics (Hare, 1991; Hare et al., 1990; Harpur, Hare, & Hakstian, 1989). These two factors have led scholars to a variable-centered approach to studying psychopathy, in which the interpersonal/affective features were constructed as “primary” psychopathy and the impulsive/lifestyle traits were constructed as “secondary” psychopathy (Frick, Bodin, & Barry, 2000; Levenson, Kiehl, & Fitzpatrick, 1995; Williams, Paulhus, & Hare, 2007). However, some research has used a person-centered, rather than variable-centered, view of psychopathy to identify subtypes (Alterman et al., 1998; Hicks, Markon, Patrick, Krueger, & Newman, 2004; Poythress & Skeem, 2005). In this view, primary and secondary psychopath *variants* exhibit similar levels of psychopathic traits but differ in other key areas, particularly in emotional distress and anxiety; primary variants have low levels of anxiety, whereas secondary variants have high levels of anxiety (Blackburn, 1975; Harpur et al., 1989; Hicks & Patrick, 2006; Karpman, 1941, 1948). Although others have labeled these variants as “idiopathic” or “traditional” (for primary) and

“symptomatic” or “distressed” (for secondary), we use the descriptors *primary* and *secondary* for ease of presentation given recent emphasis on the use of these terms (Cox et al., 2013; Fanti, Demetriou, & Kimonis, 2013; Kahn et al., 2013; Kimonis, Frick, Cauffman, Goldweber, & Skeem, 2012).

The person-centered approach to identifying variants unpacks the common finding that the psychopathy variable is uncorrelated or negatively correlated with the anxiety variable (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Schmitt & Newman, 1999). Although anxiety is seen as the key distinguishing factor, these two variants differ in a myriad of other ways, including their exposure to aggression and violence, their psychopathology, and their violent and aggressive behavior (Kimonis, Skeem, Cauffman, & Dmitrieva, 2011; Vaughn, Edens, Howard, & Smith, 2009; see Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003, for a review).

Although much theorizing on primary and secondary variants has centered around adults (see Poythress & Skeem, 2005, for a summary), researchers have begun to examine these variants with adolescent samples. Some of this newer research has focused on community (Fanti et al., 2013; Vitale et al., 2005) or clinic-referred (Kahn et al., 2013) samples of adolescents, but much has focused on detained samples (Kimonis et al., 2012; Kimonis et al., 2011; Vaughn et al., 2009). In most of these studies, findings have mirrored those found in adult populations, such that secondary variants have greater negative affect and histories of trauma and abuse compared to primary variants (Kahn et al., 2013; Kimonis et al., 2012; Kimonis et al., 2011; Vaughn et al., 2009), and often display more aggression (Fanti et al., 2013; Kahn et al., 2013).

Exposure to aggression and violence.—Previous work has demonstrated that secondary psychopathy variants, compared to primary variants, have had more adverse experiences, such as abuse (Kahn et al., 2013; Kimonis et al., 2011), maltreatment (Kimonis et al., 2012), negative life events and posttraumatic stress symptoms (Sharf, Kimonis, & Howard, 2014), and trauma and victimization (Tatar, Cauffman, Kimonis, & Skeem, 2012; Vaughn et al., 2009). Most of these studies used samples of detained adolescents, with the exception of Kahn et al. (2013), who used a clinic-referred sample. Of importance, although the secondary variant of psychopathy appears reliably linked to intense forms of trauma and victimization, it is not clear whether this variant also includes exposure to milder forms of victimization (e.g., being victimized by rumors, being threatened at school) or witnessing violence outside of the home. Both “low-level” victimization (Boxer, Edwards-Leeper, Goldstein, Musher-Eizenman, & Dubow, 2003) and community violence exposure (Boxer et al., 2008) are key risk factors for behavioral maladjustment generally, and might relate meaningfully to juvenile psychopathy as well. To broaden our understanding of how the primary/traditional and secondary/distressed variants might be differentiated, it is important to incorporate these other common social-ecological risk factors into an assessment.

Psychopathology.—Studies on the primary/secondary variant distinction also have found that secondary variants experience greater negative affect (Kimonis et al., 2012); psychological distress, suicidal ideation, attention deficit hyperactivity disorder, and antidepressant medication use (Vaughn et al., 2009); depression and psychological stress

(Kimonis et al., 2011); internalizing and externalizing symptomatology (Kahn et al., 2013; Poythress et al., 2010); impulsivity (Kahn et al., 2013); and personality disorder traits and major mental illness (Skeem, Johansson, Andershed, Kerr, & Loudon, 2007). Again, with the exception of Kahn et al. (2013), these studies were conducted exclusively with offenders. Therefore, it remains unclear how psychopathy variants in a community sample might differ in their mental health symptoms.

Violent and aggressive behavior.—With respect to violence and other forms of aggression, studies have shown that secondary variants typically exhibit higher levels of these behaviors compared to primary variants. For example, Kimonis et al. (2011) reported that 92% of secondary variants committed institutional violence over a 2-year period, compared to 69.4% of primary variants, and another showing that secondary variants are more prone to aggressive misconduct while incarcerated (although that latter study was conducted with adults; Poythress et al., 2010). Of importance, one study on a community sample of adolescents found that secondary variants had more conduct problems and were more aggressive than were primary variants (Fanti et al., 2013). It does indeed appear that primary and secondary variants in both detained and community samples exhibit variation in aggression. However, it still remains to be seen whether similar patterns would be observed in a broad study of integrating community and detained samples with a wider range of social-ecological risk.

Callous–Unemotional Traits

Callous–unemotional traits involve a lack of guilt, decreased empathy, and the callous use of others for personal gain (Barry et al., 2000; Frick, Blair, & Castellanos, 2013; Frick, Ray, Thornton, & Kahn, 2014; Frick & White, 2008). These traits develop as early as childhood and are highly associated with psychopathic thoughts, behaviors, and tendencies (Frick, 1998; Frick et al., 2013; Frick et al., 2014; Frick & White, 2008). These traits in particular, rather than the full spectrum of psychopathic characteristics, are usefully assessed in children and adolescents because callous–unemotional traits are present at a young age; are relatively stable across time; and are highly associated with aggression, delinquency, and other negative outcomes, including academic underinvestment (Frick & Morris, 2004; Frick & White, 2008). Previous studies also have demonstrated that callous–unemotional traits are associated with a variety of thoughts and behaviors that are typically associated with psychopathy, such as thrill seeking, narcissism, impulsivity, sensitivity to reward, decreased empathy, and beliefs that aggression will lead to reward (e.g., dominance over others) rather than punishment (Barry et al., 2000; Fanti et al., 2013; Pardini, Lochman, & Frick, 2003). However, to our knowledge, only two studies have attempted to identify clusters or classes of juvenile psychopathy variants based on callous–unemotional traits rather than the full range of psychopathic traits (Fanti et al., 2013; Kahn et al., 2013). If adolescent variants classified via callous–unemotional traits specifically show patterns of adjustment similar to adolescent and adult variants classified via psychopathic traits generally, it might help clarify the etiology of these variants and facilitate their identification.

Present Study

The present study investigates key differences in adverse experiences, psychopathology, and externalizing behaviors between primary/traditional and secondary/distressed psychopathy variants in adjudicated and student samples. Although these variants have been studied widely in incarcerated adult populations (Hicks et al., 2004; Hicks, Vaidyanathan, & Patrick, 2010; Koenigs, Kruepke, & Newman, 2010; Newman, MacCoon, Vaughn, & Sadeh, 2005; Skeem et al., 2007), research is only recently beginning to extend these variants to youth, and there is no research comparing adolescents in the community and in detention facilities using these indicators and outcomes. This study aims to fill this gap by examining primary and secondary variants of high school students and adjudicated adolescents in detention facilities. Further, we use data from other informants (i.e., parents and teachers) to augment our self-report data, and our sample includes a substantial portion (39.63%) of female participants, allowing us to examine cluster classification by gender and control for gender in analyses.

Finally, in the present study we apply model-based cluster (MBC) analysis to identify variants. Recent studies of psychopathy subtypes among juveniles have made use of this analytic approach (Hicks et al., 2004; Kimonis et al., 2011; Lee, Salekin, & Iselin, 2010; Skeem et al., 2007). This type of analysis has many advantages compared to traditional cluster analyses, including its data-driven approach that requires no a priori assumptions or hypotheses about the data. MBC seeks to find the number and type of clusters most likely to have produced a given data set of variables (Fraley & Raftery, 1998). We will ascertain whether MBC can be used to assess different variants of callous–unemotional traits specifically (rather than psychopathy in general) in our mixed sample, something that previous studies have not done.

Although previous studies have typically found two clusters (i.e., primary and secondary variants) using samples of adolescents with high psychopathy scores (e.g., Kimonis et al., 2012; Kimonis et al., 2011), we hypothesize that our MBC will reveal three clusters in our data, because we are using a mixed sample and not excluding cases based on low callous–unemotional scores (although see Fanti et al., 2013, for a four-cluster solution). These three clusters will be based on callous–unemotional traits and anxiety: primary callous–unemotional variants (high callous–unemotional traits, low anxiety), secondary callous–unemotional variants (high callous–unemotional traits, high anxiety), and nonvariants (low callous–unemotional traits, low anxiety). Further, we hypothesize that secondary variants, compared to primary variants and nonvariants, will report greater exposure to aggression and violence, more symptoms of psychopathology, and more aggressive and violent behavior, as in previous studies (e.g., Fanti et al., 2013; Kimonis et al., 2012; Kimonis et al., 2011; Vaughn et al., 2009).

METHODS

Participants

Data for this study were collected for a larger project examining risk factors for violent and nonviolent antisocial behavior among youth attending public high schools (*students*; $n=419$;

52.5% female; $M_{age}=16.84$ 16.84 years, $SD=.71$) and youth detained in county and state justice facilities (*delinquents*; $n=380$; 26.3% female; $M_{age}=15.57$ years, $SD=1.51$). Although data were originally collected for 820 youth, 21 cases are excluded from the current analyses because they have missing data. The racial=ethnic composition of the samples is as follows: Of the high school students, 53.70% are White=Caucasian, 38.19% are Black=African American, 2.39% are biracial, 2.39% are multiracial, 1.43% are Hispanic=Latino=a, 0.72% are Asian=Asian American, 0.72% are an “other” ethnicity, 0.24% are Native American, and data were missing for one (0.24%) high school student; of the delinquent sample, 54.74% were White=Caucasian, 26.84% were Black=African American, 5.79% were Hispanic=Latino=a, 5.79% were biracial, 4.47% were multiracial, 0.79% were Native American, 0.79% were an “other ethnicity, no delinquent youth identified as Asian=Asian American, and racial=ethnic data were missing for 0.79% of delinquent youth.

Youth completed extensive individual interviews, and their parents/guardians ($n=728$) as well as teachers/staff ($n=717$) provided data through telephone or mailed surveys. The average consent rate for parents contacted was 40%. Data from at least one other source were available for all 799 youth; data from both additional sources were available for 639 youth (79.97%). By sample, the student group was significantly older ($p<.001$) and included a greater proportion of female participants ($p<.001$); non-Whites were represented equally across the two groups ($p=.81$). Parent education was measured as an ordinal variable with seven categories: less than eighth grade, finished eighth grade only, finished high school, some college or professional training, finished college or professional training, some graduate school, and finished graduate school. Chi-square analysis revealed that parents’ levels of education differed significantly between the high school sample (1.67% did not graduate high school, 27.92% graduated college) and the adjudicated sample (12.63% did not graduate high school, 12.90% graduated college), $\chi^2(6)=64.34$, $p<.001$, Cramer’s $V=0.30$. Parents’ marital status also differed significantly between the high school sample (62.29% married) and the adjudicated sample (36.84% married), $\chi^2(2)=58.76$, $p<.001$, $V=0.29$. Finally, household income differed significantly between the high school sample (29.59% made \$30,000 or less) and the adjudicated sample (53.16% made \$30,000 or less), $\chi^2(8)=86.15$, $p<.001$, $V=0.35$. In subsequent analyses, the high school and delinquent samples will be collapsed into one sample to understand what variant membership will look like overall, as well as for each separate sample. Collapsing both samples into one allows for the measurement of a broader range of the variables of interest (e.g., callous-unemotional traits) simultaneously.

Measures

Callous-unemotional traits.—Youth, parents/guardians, and teachers/staff completed informant-specific versions of Frick’s (2004) Inventory of Callous–Unemotional Traits (ICU). The ICU was designed to capitalize on the strengths of the Callous–Unemotional subscale of the Antisocial Process Screening Device (Frick & Hare, 2001) while correcting some of the weaknesses of that measure. Scores from the Callous–Unemotional scale of the Antisocial Process Screening Device have been linked meaningfully to serious aggression and related constructs in at-risk and delinquent adolescent populations, including severe and

violent offending (Kruh, Frick, & Clements, 2005), early onset of offending (Silverthorn, Frick, & Reynolds, 2001), emotional deficits (Loney, Frick, Clements, Ellis, & Kerlin, 2003), and social cognitions favoring aggression (Pardini et al., 2003). Recent studies have established the basic reliability and construct validity properties of the self-report version of the ICU in detained and community samples of adolescents similar to the current sample (Essau, Sasagawa, & Frick, 2006; Kimonis et al., 2008). On the ICU, ratings are made of “how well” each of 24 statements describes the target youth along a 4-point scale from 0 (*not at all true*) to 3 (*definitely true*). Items tapped three theorized components of the callous–unemotional construct, including Uncaring (e.g., does not care about performance at school or work), Callous (e.g., does not care about hurting others to achieve instrumental goals), and Unemotional (e.g., hides feelings from others). Although scores from the measure may be examined as three separate subfactors, many prior studies with the ICU have observed more meaningful and robust findings with respect to reliability and validity via the total score (excluding two consistently unreliable items: does not know right from wrong, does not let feelings control him/her; Kimonis et al., 2008).

Each informant score is the mean of all 22 included items. For the present study, we used a mean composite score integrating the total scores of all three informants—youth self-reports ($\alpha=.83$), parent/guardian reports ($\alpha=.93$), and teacher/staff reports ($\alpha=.92$). These scores were modestly but significantly intercorrelated ($r_s=.26 - .27, p<.001$). No previous work has demonstrated consistent primacy for any particular informant on the ICU in regard to outcomes; thus, following a general multisource approach to assessment and based on some previous work with our sample, we used the simple unweighted geometric mean of the three scores to form ICU composites (Docherty, Boxer, Huesmann, O’Brien, & Bushman, 2014).

Psychopathology.—Youth completed the six-item Anxiety (e.g., “suddenly scared for no reason”), six-item Depression (e.g., “feeling hopeless about the future”) and five-item Psychoticism (e.g., “the idea that something is wrong with your mind”) subscales of the Brief Symptom Inventory (BSI; Derogatis, 1992). Youth rated the extent to which they have experienced various symptoms of each form of psychopathology during the 7 days prior to assessment on a 5-point scale from 0 (*not at all*) to 4 (*extremely*). Composite scores are the mean of the raw item scores for each scale multiplied by the number of items on the scale (Anxiety $\alpha=.84$; Depression $\alpha=.96$; Psychoticism $\alpha=.76$). Prior research has found this measure to be valid and reliable among adult and adolescent samples (Canetti, Shalev, & De-Nour, 1994; Derogatis & Melisaratos, 1983).

Violence and general aggression.—To measure these constructs we used reliable multi-informant composite scores indicating “Violence” (youth, parent/guardian, and teacher/staff reports of serious physical aggression; parent/guardian report of injurious behavior; Boxer, Huesmann, Bushman, O’Brien, & Mocerri, 2009; Lefkowitz, Eron, & Walder, 1977) and “General Aggression” not specifically violent in nature (youth report of delinquent behavior and trait aggressiveness; parent/guardian report of conduct problems; teacher/staff report of conduct problems and general aggression; Buss & Perry, 1992; Elliott & Huizinga, 1983; Goodman, 2001; Huesmann, Eron, Guerra, & Crawshaw, 1994). Study measures used to create these composite variables have been used in adolescent samples

similar to ours (Boxer et al., 2013; Goodman, 2001; Henggeler, Melton, & Smith, 1992; McConville & Cornell, 2003; Morren & Meesters, 2002).

These scores were estimated on the full sample of 820 youth via latent variable modeling using full information maximum likelihood in the AMOS 7.0 program (Arbuckle, 2006). AMOS applies full information maximum likelihood to analyze the model fit in the presence of missing data, and subsequently can generate latent factor scores via regression imputation. Full measurement details including sample items, scale composition, fit statistics, and known-groups validity of factor scores have been described extensively (Boxer et al., 2009).

Exposure to low-level aggression.—Youth completed an 11-item measure to assess experiences with witnessing and being victimized by “low-level” aggressive acts of direct and indirect verbal aggression and mild physical aggression (e.g., “How often have you seen another person get hit or pushed?” “How often have you had rumors spread about you?”; Boxer et al., 2003). Responses were made on a 4-point scale from 0 (*never*) to 3 (*a lot of times*). Previous research with this measure has examined subtypes of exposure separately (Boxer et al., 2003; Musher-Eizenman et al., 2004), but for the purposes of the present investigation we used the internally reliable total score, computed as the mean of all items (Cronbach’s $\alpha=.81$). Previous studies with this measure have validated it for use in community samples slightly younger than the current sample (Boxer et al., 2003; Musher-Eizenman et al., 2004).

Exposure to neighborhood violence, past and current.—Youth completed the four-item Neighborhood Violence subscale of the Stressful Urban Life Events Scale (Attar, Guerra, & Tolan, 1994; see also Guerra, Huesmann, & Spindler, 2003). Youth indicated (0=*no*, 1=*yes*) whether they had been exposed to specific indicators of neighborhood violence (e.g., “Have you seen anyone beaten, shot, or really hurt by someone?”). Composite scores are the sum of the four indicators for childhood and recent periods (KR20 [childhood]=.58, KR20 [recent]=.56). Although these internal reliability estimates are less than optimal, it is neither unusual nor problematic for event history checklists to produce low internal reliability coefficients, as functionally they operate as indexes rather than scales (Streiner, 2003).

Procedures

All procedures were approved by the Institutional Review Board of the University of Michigan, which held primary responsibility for regulating the implementation of the study. Also approving our procedures were the state agency overseeing the state detention facilities, the federal Office of Human Research Protections, the Institutional Review Board of the Centers for Disease Control, and the directors or principals of all schools and detention facilities involved in the project. Youth were recruited from public high schools (rural, suburban, and urban) and juvenile detention centers (county and state) selected to yield a sample representing a range of risk for aggressive and violent behavior. Participant recruitment procedures differed across the two sample types.

In high schools, informational letters and parental consent forms were mailed with stamped return envelopes to parents/guardians of students in 11th and 12th grades; 2 weeks after the initial mailings, second mailings were sent to parents/guardians who had not responded by that time. Remaining parents/guardians who did not respond by mail to the second contact attempt were solicited by telephone. Parents/guardians could grant permission for their children to participate in writing (mailed) or over the telephone (recorded). After their children were interviewed, parents/guardians and the youths' teachers (usually social studies teachers; if those teachers were unwilling or unavailable we worked with schools to identify replacements who knew the target youth well) were provided with survey booklets to complete. Parents/guardians had the option of completing surveys over the telephone. Teachers completed surveys by paper and pencil. Youth interviews were conducted via paper-and-pencil Scantron survey forms in small groups ranging typically from about 10–15 students depending upon availability, and led by at least two trained staff for every 10–15 students.

In detention facilities, informational letters and consent forms typically were sent to parents/guardians of all youth housed by the facilities at the start of data collection and provided to the parents/guardians of any new admissions to the facilities over the period of data collection. In these facilities, we were permitted to make the follow-up telephone calls without first sending a second mailing. As with the students, after a delinquent youth completed his or her interview, we mailed a survey to parents/guardians and provided a survey to staff. Again, parents/guardians had the option to complete their surveys over the telephone, and staff completed surveys by paper and pencil. Youth interviews were conducted individually by trained staff via laptop computer. Most youth interviews with students and delinquents took approximately 1 hr.

Across data collection sites, all individuals who provided data were compensated financially in some manner, primarily with gift certificates to local merchants, with variations from site to site due to agency regulations or extraneous factors. All high school students received \$20, except those in a school collaborating with our research team on another investigation necessitating compensation of \$40. All delinquents received \$10 compensation due to agency restrictions. Parents/guardians of high school students received \$25; parents/guardians of delinquents received \$50. All teachers and staff received \$5 per completed survey, although this was distributed differently by site due to school or agency policies (e.g., teachers typically received cash but staff had their compensation put into a common fund for staff-wide rewards such as appreciation lunches).

RESULTS

Descriptives and Correlations

Descriptive statistics of study variables for the overall sample and each subsample can be seen in Table 1, and bivariate correlations between continuous study variables can be seen in Table 2. For each of the study variables, the adjudicated youths scored significantly higher than the high school students ($p < .001$). Most of the study variables appear to be strongly correlated, and the only nonsignificant correlations appear to be between age and exposure to low level aggression, and age and exposure to current neighborhood violence.

MBC Analysis

We used MBC analysis to generate clusters in the data based on callous–unemotional traits and anxiety, similar to previous studies that have used psychopathic traits and anxiety (Kimonis et al., 2012; Lee et al., 2010; Skeem et al., 2007; Tatar et al., 2012), using the *mclust* package in R (Fraley, Raftery, Murphy, & Scrucca, 2012; R Core Team, 2013). MBC is preferable to other types of cluster analyses because it tests the relative fit of 90 different models that vary in their assumptions about the number, distribution, volume, shape, and orientation of clusters present in the data, rather than “forcing” the data to conform to a specific number of clusters a priori (Fraley & Raftery, 1998). The number of clusters is allowed to vary from one to nine; the distribution of clusters can be spherical, diagonal, or ellipsoidal; the volume and shape of clusters can be equal or variable; and the orientation of clusters can be along coordinate axes, equal, or variable (Fraley et al., 2012). This type of approach has been used in a variety of studies analyzing the differences between primary/traditional and secondary/distressed variants of psychopathy, and frequently use psychopathy and anxiety as clustering variables (Falkenbach, Poythress, & Creevy, 2008; Fanti et al., 2013; Hicks et al., 2010; Kimonis et al., 2012; Kimonis et al., 2011). However, previous uses of MBC in this context typically have been limited to data sets comprised of samples from single, circumscribed population groups such as juvenile delinquents (Kimonis et al., 2011; Lee et al., 2010; Tatar et al., 2012) or, less frequently, adolescents in the community (Fanti et al., 2013). In this study, we apply MBC to a large sample composed about evenly of adjudicated delinquents recruited from detention facilities and adolescents recruited from high schools. Thus we are able to explore the replicability of cluster solutions obtained in previous studies while expanding the scope of that analysis to examine a wider range of social-behavioral functioning in a single set of analyses.

For this cluster analysis, we used standardized scores (*z* scores) of the total ICU mean score as well as the self-report of anxiety. The analysis then used Bayesian Information Criterion (BIC) to determine that the bestfitting model to the data was one with four clusters that are diagonal in distribution, have variable volume and variable shape, and are oriented along coordinate axes (BIC=−4165.46). Further, this model had a greater BIC than the second-best-fitting model, which proposed five clusters and had a BIC of −4182.82, and the third-best-fitting model, which proposed three clusters and had a BIC of −4186.62, suggesting that the four-cluster model is a much better fit for the data than the five- and three-cluster models (Jeffreys, 1961; Kass & Raftery, 1995). The characteristics of the final clusters are discussed in more detail next. The average probability that observations are correctly assigned to a cluster is 80.18%. (Additional fit statistics for cluster solutions can be obtained from the first author.)

Description of Clusters

A total of 799 participants were available for the cluster analysis (i.e., had complete data for callous–unemotional traits and anxiety). The first cluster ($n=196$) had the lowest mean total CU score ($M=1.00$, $SD=0.29$) and a moderate anxiety score ($M=2.20$, $SD=0.74$), so this cluster was deemed to be the *nonvariant* cluster. Of the adolescents in this cluster, 62.76% are male, 32.14% are from the adjudicated sample, and 52.31% are White. The second cluster ($n=312$) had a high CU score ($M=1.16$, $SD=0.36$) and a relatively high anxiety score

($M=6.05$, $SD=1.73$). We labeled this cluster the *fearful psychopath* cluster, in alignment with a previous study that also found a similar cluster (Poythress et al., 2010). About 58.01% of the adolescents in this cluster are male, 45.83% are adjudicated, and 56.09% are White. The third cluster ($n=169$) had a high CU score ($M=1.20$, $SD=0.38$) and low anxiety score ($M=0.33$, $SD=0.47$), and therefore is labeled the *primary/traditional callous-unemotional variant* cluster. This cluster was 68.64% male, 50.89% adjudicated, and 49.40% White. Finally, the fourth cluster ($n=122$) had a high CU score ($M=1.25$, $SD=0.35$) and a high anxiety score ($M=14.70$, $SD=3.60$), so it is the *secondary/distressed callous-unemotional variant* cluster. This cluster was 48.36% male, 72.13% adjudicated, and 60.66% White. Table 3 displays differences between clusters in demographic data and on clustering variables.

Supporting the clustering solution, analyses of internal cluster variables (i.e., CU traits and anxiety) indicated that the clusters differed significantly by CU traits, $F(3, 795)=16.77$, $p<.001$, partial $\eta^2=0.06$, such that the primary/traditional, secondary/distressed, and fearful clusters had significantly greater CU traits than the nonvariant cluster ($p<.001$), but did not differ from each other. The clusters also differed significantly by anxiety, $F(3, 795)=1,707.52$, $p<.001$, partial $\eta^2=0.87$, such that the secondary/distressed cluster had the highest anxiety score, followed by the fearful cluster, the nonvariant cluster, and finally the primary/traditional cluster (all comparisons significant at $p<.001$). Tukey's honest significant difference (HSD) was used to compute all post hoc comparisons. Figure 1 provides a graph of these results.

Analyses of demographic differences among the cluster groups indicated no differences by ethnicity/race when comparing numbers of White versus non-White members, $\chi^2(1)=4.30$, $p=.231$, Cramer's $V=0.07$, but significant variation by gender, $\chi^2(1)=13.27$, $p=.004$, $V=0.13$, and adjudicated status, $\chi^2(1)=49.34$, $p<.001$, $V=0.25$. Two-tailed, two-sample tests of proportions were conducted between each possible pair of clusters to test for gender differences and differences by adjudicated status. Because all of the 12 possible pairwise comparisons were tested, the usual alpha level of .05 was adjusted to .004 (.05/10=.004) to adjust for the familywise error rate. These comparisons indicated that the secondary/distressed callous-unemotional cluster had a significantly greater proportion of female participants than the primary/traditional callous-unemotional cluster ($p<.001$). For differences in adjudicated status, proportion tests indicated that the nonvariant cluster had a greater proportion of high school students than the primary/traditional ($p<.001$), secondary/distressed ($p<.001$), and fearful ($p=.002$) clusters, and the secondary/distressed cluster had a greater proportion of adjudicated participants than the primary/traditional and fearful clusters ($p<.001$). An F test indicated that the clusters differed significantly on age, $F(3, 795)=11.26$, $p<.001$, partial $\eta^2=0.04$, such that the primary/traditional and secondary/distressed clusters are younger than the nonvariant cluster ($p<.001$), and the secondary/distressed cluster is younger than the fearful cluster ($p=.002$), according to Tukey's HSD tests. Finally, a chi-square indicated that there was no differences in household income between the clusters, $\chi^2(24)=26.54$, $p=.326$, Cramer's $V=0.11$.

Mental Health

Next, we assessed group differences by cluster on two different mental health variables, depression and psychoticism. To test for group differences, we ran two different analyses of covariance (ANCOVAs), one for depression and one for psychoticism. Each ANCOVA included adjudicated status (adjudicated vs. high school) and gender (male vs. female) as dummy-coded categorical covariates, and age as a continuous covariate, because these variables differ significantly across the clusters. ANCOVA results for mental health, aggressive and violent behavior, and exposure to aggression and violence are depicted in Figure 2.

The ANCOVA for depression indicated that the clusters significantly differed in depression, $F(3, 791)=261.53, p<.001$, partial $\eta^2=0.50$, and post hoc Tukey's HSD comparisons for the adjusted means indicated that each of the pairwise comparisons was significant ($p<.001$ for all comparisons). Specifically, the secondary/distressed group was highest in depression, followed by the fearful group, the nonvariant group, and the primary/traditional group. The ANCOVA for psychoticism suggested similar results, $F(3, 791)=213.16, p<.001$, partial $\eta^2=0.45$, again with all post hoc pairwise comparisons significant at $p<.001$, and the order of clusters remaining the same.

Aggressive and Violent Behavior

To assess differences in aggressive and violent behavior by cluster, we ran two more ANCOVAs, with the same covariates (adjudicated status, gender, and age) as in the previous analyses. Again, the ANCOVA for violent behavior indicated that there were significant group differences between the clusters, $F(3, 792)=11.31, p<.001$, partial $\eta^2=0.04$. Post hoc comparisons indicated that the fearful and secondary/distressed clusters were more violent on average than the nonvariant cluster ($p<.001$) and that the secondary/distressed cluster was more violent on average than the primary/traditional cluster ($p<.01$). The ANCOVA for aggressive behavior produced similar results, $F(3, 792)=12.77, p<.001$, partial $\eta^2=0.05$, and post hoc comparisons indicated that the fearful and secondary/distressed clusters were more aggressive on average than the nonvariant cluster ($p<.001$) and that the secondary/distressed cluster was more aggressive than the primary/traditional cluster ($p=.001$).

Exposure to Aggression and Violence

Finally, we ran three more ANCOVAs with the same covariates, this time to determine whether the clusters varied in their present exposure to low-level aggression and their past and current exposure to neighborhood violence, and again the results suggested significant group differences. After running the ANCOVA for low-level exposure and getting significant results, $F(3, 787)=41.75, p<.001$, partial $\eta^2=0.14$, we ran the post hoc comparisons and found that the fearful and secondary/distressed clusters were more exposed to low-level aggression than both the nonvariant and primary/traditional clusters ($p<.001$) and that the secondary/distressed cluster was more exposed to low-level aggression than the fearful cluster ($p=.005$).

The ANCOVA for exposure to past neighborhood violence was also significant, $F(3, 792)=8.09, p<.001$, partial $\eta^2=0.03$, and significant group differences indicated that the

secondary/distressed cluster had greater exposure to past neighborhood violence than both the nonvariant cluster ($p=.005$) and the primary/traditional cluster ($p<.001$), and the fearful cluster had greater exposure than the primary/traditional cluster ($p=.003$). Finally, the ANCOVA for exposure to current neighborhood violence was significant, $F(3, 786)=11.24$, $p<.001$, partial $\eta^2=0.03$, such that the secondary/distressed and fearful clusters had greater exposure than the primary/traditional cluster ($p<.001$ and $p=.001$, respectively) and the nonvariant cluster ($p=.009$ and $p=.039$, respectively).

DISCUSSION

In this study, we collected extensive data from adolescents in the community as well as in detention facilities, obtaining both self-report and multi-informant data through questionnaires and interviews. We examined the relationship between different types of callous–unemotional variants and mental health, exposure to violence and aggression, and violent and aggressive behavior. Our analyses used multi-informant data among a sample of adolescents from both high schools ($n=430$) and juvenile detention facilities ($n=390$). Our findings contribute to the ongoing refinement of identifiable variants of psychopathy. We found that, consistent with our hypotheses, secondary (distressed, symptomatic) variants reported significantly greater levels of psychopathology, exposure to violence and aggression, and violent and aggressive behavior, compared to both primary (traditional, idiopathic) variants as well as nonvariants.

The results of this study have important implications for theories on development of antisocial behavior and psychopathy. Unlike many studies that have focused on samples that are either incarcerated or at very high risk, this study included a large, blended sample of youth drawn from the community as well as detention centers, relatively high in minority representation (~45% racial/ethnic minority), and included a wide range of parent education backgrounds (i.e., about 7% did not graduate high school, about 21% graduated college).

Similar to previous research, we found two subgroups of adolescents with callous–unemotional traits differing in levels of anxiety. *Primary callous–unemotional variants* presented with low anxiety, whereas *secondary callous–unemotional variants* reported higher anxiety. We found many expected differences between the groups: Secondary variants had worse outcomes than did primary variants. These findings are in line with previous research that secondary variants seem more influenced by contextual factors and exhibit more psychopathology and aggression (Kimonis et al., 2012; Kimonis et al., 2011). This is in line with theories and research suggesting that youth exposed to aggression and violence may cope negatively with this exposure and that negative coping may include both internalized coping (e.g., anxiety, depression) and externalized coping (e.g., aggression; Boxer & Sloan-Power, 2013). We also found demographic differences between the clusters in that secondary variants were younger and more likely to be female and adjudicated. However, differences in outcomes remained even when controlling for these demographic characteristics.

We also observed a third group of adolescents with high callous–unemotional traits but with higher anxiety than the primary variants and lower anxiety than the secondary variants. We labeled this group the “fearful” cluster, in line with previous research that has found a

similar group using the same analysis (Cox et al., 2013; Magyar, Edens, Lilienfeld, Douglas, & Poythress, 2011; Poythress et al., 2010). It is worth noting that this fearful cluster reported many of the same risk factors and outcomes as distressed variants, although not always to the same extent, and that it was the largest cluster in the sample. Although the rate of classification into this cluster was surprisingly high, at least one other study has also found a high classification rate into the fearful cluster (Cox et al., 2013). Poythress et al. (2010) hypothesized that this fearful cluster may represent Mealey's (1995) "disadvantaged" secondary psychopath, in that it may represent a cluster of youth who are at risk because of social and economic disadvantage (i.e., family structure, socioeconomic status, etc.). However, our results do not bear this out, as the fearful cluster did not differ significantly in household income from the other clusters. This fearful cluster might represent a *transitional* cluster, in which adolescents are experiencing the adverse events and exposure to violence and aggression characteristic of the secondary variant but are still in the early stages of dealing with these events. Adolescents in this transitional cluster might become secondary variants later on, as their anxiety levels rise due to the stressors in their environment. To our knowledge, this unexpected result represents the first independent replication of Poythress et al.'s (2010) findings, and the first identification of a fearful cluster in a mixed sample of adolescents. It is possible that we found this fourth cluster because we used a callous-unemotional trait total score, rather than a full psychopathic trait measure or callous-unemotional subscale scores; or because we did not select for high callous-unemotional traits. Previous studies using model-based clustering have done one or both (Hicks et al., 2004; Kimonis et al., 2011; Skeem et al., 2007). Although we also had an unexpected finding with the age differences, it is difficult to draw any conclusions regarding these differences given the cross-sectional design of the study.

Our findings suggest that secondary variants, compared to primary variants and nonvariants, are experiencing more negative life events and exhibiting more symptoms of psychopathology, including externalizing behaviors. These differences highlight the importance of recognizing the heterogeneous nature and potential etiological variations of psychopathy. It has long been thought that psychopathy is a genetically predetermined personality disorder (Blonigen, Carlson, Krueger, & Patrick, 2003; Viding, Blair, Moffitt, & Plomin, 2005), and studies have shown that the two variants are equally influenced genetically in community samples with subclinical levels of psychopathy (Blonigen, Hicks, Krueger, Patrick, & Iacono, 2005; Humayun, Kahn, Frick, & Viding, 2014; Larsson, Andershed, & Lichtenstein, 2006; Taylor, Loney, Bobadilla, Iacono, & McGue, 2003). It might be that a refined understanding of pathways to primary and secondary variants will accrue from a dialectic perspective on genes and environment: genetic and environmental influences interacting differently to produce the risk factors and outcomes associated separately with primary and secondary variants (Porter, 1996; Sameroff, 2010). For example, studies have found that the association between parenting behavior and adolescents' antisocial behavior is moderated by the two different factors of psychopathy (Edens, Skopp, & Cahill, 2008), suggesting that the interaction of genetic and environmental risk might be very different for primary and secondary variants. Future research, especially longitudinal designs, will help uncover these developmental pathways.

Our study was limited in a few ways. Some indicators relied on self-report data from target youth, and our measure of psychopathology (the BSI) relied on a 1-week assessment frame. However, event histories can be difficult to obtain outside of self-report, and the BSI has shown excellent validity and test-retest stability (Maruish, 1994). Also, the cross-sectional design of this study limited our ability to draw inferences about causality. This is a key limitation that should be addressed in future studies given broader developmental theory regarding the origins of callous–unemotional traits, which might be innate and thus present from a very early age or shaped gradually over time through highly adverse experiences (Frick, Cornell, Barry, Bodin, & Dane, 2003; Frick & Morris, 2004; Frick & White, 2008). Further, although we were able to find a number of significant differences between different variant groups, some effect sizes were small. Of course, small effect sizes are not uncommon in social research and still can reflect findings of great practical importance (McCartney & Rosenthal, 2000).

Despite these limitations, there are key contributions of this investigation. Adolescents who present with “psychopathy-like” characteristics (Caldwell, Skeem, Salekin, & Van Rybroek, 2006; Murrie, Cornell, Kaplan, McConville, & Levy-Elkon, 2004; Murrie et al., 2007; Skeem & Cauffman, 2003; Skeem & Petrila, 2004), such as callous–unemotional traits, are not a homogeneous group, and therefore it may not make sense clinically or empirically to view or treat them as such. If anxiety is a key distinguishing factor between primary and secondary variants of callous–unemotional traits, then assessments of callous–unemotional traits for adolescents in both scientific and clinical uses may benefit from including a measure of anxiety. Adolescents could then be grouped and managed accordingly.

Bolstering assessments of callous–unemotional traits by including measures of anxiety can be particularly important for clinicians and corrections staff members, who need to make accurate assessments about their clients in order to treat them most effectively. For example, a specifier of “limited prosocial emotions” has been added to the diagnostic criteria for conduct disorder in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013; Regier, Kuhl, & Kupfer, 2013) and indicates whether a youth who meets the criteria for conduct disorder also has callous–unemotional traits. However, the results of this study in tandem with previous research indicate that the youth who meet the conditions for this specifier will likely not be a homogeneous group; instead, some of them will more closely resemble the primary callous–unemotional variant, and others may be more similar to the secondary callous–unemotional variant. Until such time as the diagnostic criteria can be refined, it is up to clinicians to understand the heterogeneity of the youth that will meet criteria for the same diagnosis.

Beyond assessment, practitioners should bear in mind these callous–unemotional variants as they decide on treatment plans for adolescents. Whether in the community or in a detention center, youth who exhibit high callous–unemotional traits and high anxiety clearly have different experiences and treatment needs than do youth who exhibit high callous–unemotional traits and low anxiety. The former may benefit more from cognitive-behavioral therapies that alleviate symptoms of anxiety and trauma, given their exposure to violence and their high levels of psychopathology, whereas the latter may benefit from a rewards-focused treatment that emphasizes changing beliefs and behaviors related to aggression and

violence. Although some prior research has found that children who exhibit high callous–unemotional traits are less responsive to treatment (Hawes & Dadds, 2005), no study has examined whether primary and secondary callous–unemotional variants differ in treatment processes and outcomes. Moreover, theorizing about secondary psychopathy variants indicates that they might be more responsive to treatment in general (Karpman, 1946). This dovetails with more recent literature that has found evidence of greater trauma among secondary variants (Kimonis et al., 2012; Vaughn et al., 2009). Further research is needed to determine how this treatment will be best implemented and most effective with this population.

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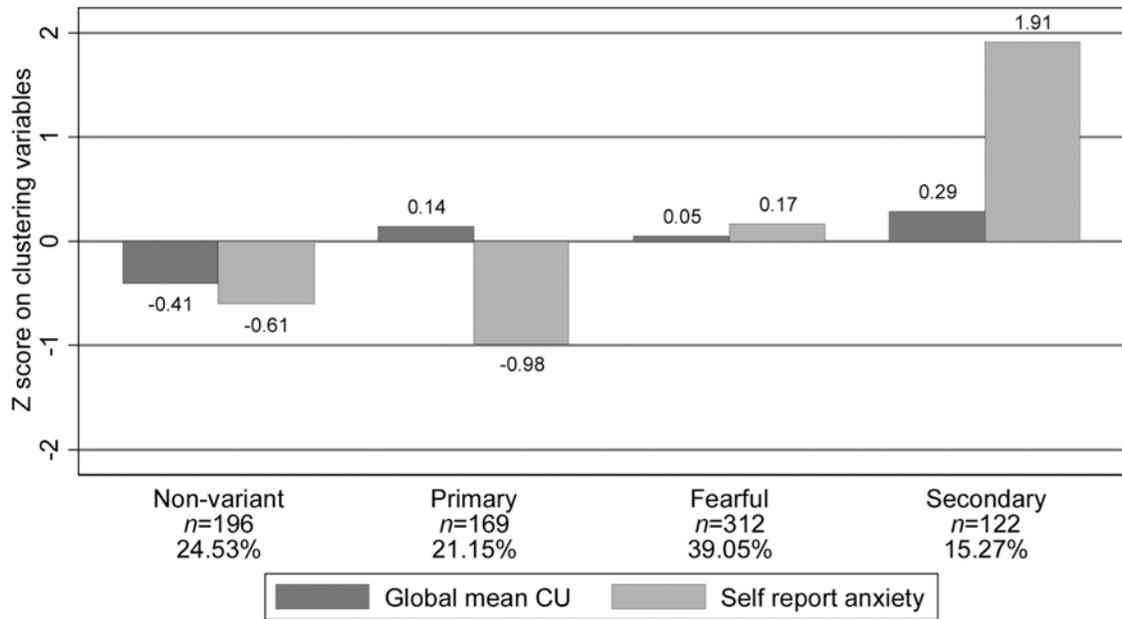


FIGURE 1.

Differences in callous–unemotional traits (CU) and anxiety by cluster with z scores presented.

Note. Levels are graphed as z-scores. Positive scores indicate values above the group mean; negative scores indicate values below the group mean.

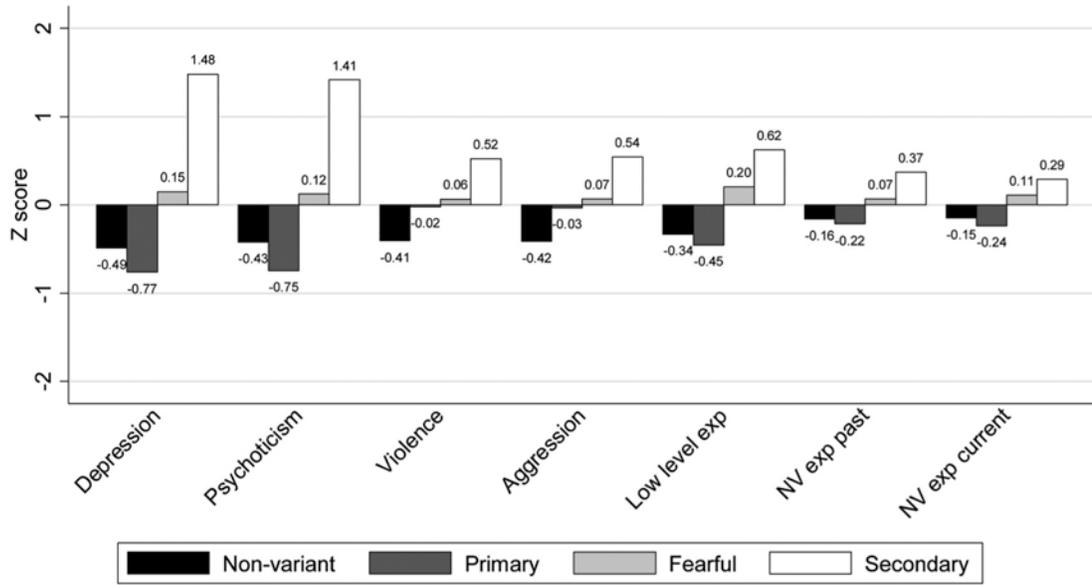


FIGURE 2. Analysis of covariance (ANCOVA) results by cluster with z scores presented.

TABLE 1

Descriptive Statistics for Study Variables by Sample

Variable	Overall			High School Students			Adjudicated Youth		
	M	SD	Min. Max.	M	SD	Min. Max.	M	SD	Min. Max.
Callous–Unemotional Traits									
Self-Report	1.01	0.39	0.05 2.09	0.90	0.34	0.18 2.00	1.13	0.42	0.05 2.09
Parent Report	1.19	0.59	0.00 3.00	0.93	0.48	0.00 3.00	1.50	0.55	0.05 2.91
Teacher Report	1.26	0.48	0.09 3.00	1.09	0.48	0.09 3.00	1.43	0.40	0.27 2.64
Total CU	1.15	0.36	0.29 2.18	0.97	0.30	0.29 1.95	1.33	0.31	0.50 2.18
Anxiety	5.21	4.96	0.00 24.00	4.28	3.98	0.00 24.00	6.24	5.69	0.00 24.00
Depression	5.97	5.59	0.00 24.00	4.82	4.52	0.00 23.00	7.24	6.34	0.00 24.00
Psychoticism	4.44	4.34	0.00 20.00	3.54	3.53	0.00 19.00	5.45	4.89	0.00 20.00
Violence	0.00	0.06	-0.10 0.32	-0.04	0.04	-0.10 0.11	0.04	0.06	-0.10 0.32
Aggression	0.00	9.00	-14.09 36.31	-5.64	5.25	-14.09 13.84	6.21	8.11	-13.13 36.31
Exposure to Low-Level Aggression	16.85	6.59	0.00 33.00	14.71	5.45	0.00 29.00	19.16	6.95	0.00 33.00
Neighborhood Violence—Past	1.53	1.20	0.00 4.00	1.25	1.08	0.00 4.00	1.83	1.26	0.00 4.00
Neighborhood Violence—Current	1.67	1.12	0.00 4.00	1.50	1.04	0.00 4.00	1.85	1.17	0.00 4.00

Note: min.=minimum; max.=maximum; CU=callous–unemotional traits.

TABLE 2

Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9
1. Total CU	—								
2. Anxiety	0.13***	—							
3. Depression	0.17***	0.79***	—						
4. Psychoticism	0.16***	0.73***	0.81***	—					
5. Violence	0.65***	0.26***	0.28***	0.26***	—				
6. Aggression	0.68***	0.26***	0.28***	0.25***	0.96***	—			
7. Low Level Exp.	0.18***	0.37***	0.43***	0.42***	0.41***	0.40***	—		
8. NV Past	0.21***	0.22***	0.20***	0.22***	0.41***	0.41***	0.35***	—	
9. NV Current	0.16***	0.20***	0.16***	0.19***	0.36***	0.36***	0.34***	0.66***	—

Note: CU=callous-unemotional traits; low level exp.=exposure to low level aggression; NV=neighborhood violence.

p < .001.

TABLE 3

Description of Clusters

Variable	Overall Sample ^a	Nonvariant ^b	Fearful ^c	Primary ^d	Secondary ^e	χ^2 or F Statistic
% Male ^{***}	60.37	62.76 ^{a,b}	58.01 ^{a,b}	68.64 ^b	48.36 ^a	13.27
% Adjudicated ^{***}	47.56	32.14 ^a	45.83 ^b	50.89 ^b	72.13 ^c	49.33
% White	54.48	52.31 ^a	56.09 ^a	49.40 ^a	60.66 ^a	4.30
M Age ^{***}	16.22	16.60 ^c	16.30 ^{b,c}	16.02 ^{a,b}	15.80 ^a	11.26
M Total CU ^{***}	1.15	1.00 ^a	1.16 ^b	1.20 ^b	1.25 ^b	16.77
M Anxiety ^{***}	5.21	2.20 ^b	6.05 ^c	0.33 ^a	14.70 ^d	1707.52

Note: Asterisks indicate significant chi-square analyses for percentages or significant *F*-tests for continuous variables between clusters. Significant differences between clusters are noted by subscripts. CU=callous-unemotional traits.

^a*N* = 820.

^b*n* = 196.

^c*n* = 312.

^d*n* = 169.

^e*n* = 122.

** *p* < .01.

*** *p* < .001.