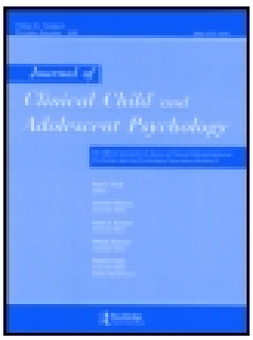

Routledge
Taylor & Francis Group

Journal of Clinical Child & Adolescent Psychology

ISSN: 1537-4416 (Print) 1537-4424 (Online) Journal homepage: http://www.tandfonline.com/loi/hcap20

Examining Predictors of Callous Unemotional Traits Trajectories Across Adolescence Among High-Risk Males

Rebecca Waller, Arielle R. Baskin-Sommers & Luke W. Hyde

To cite this article: Rebecca Waller, Arielle R. Baskin-Sommers & Luke W. Hyde (2016): Examining Predictors of Callous Unemotional Traits Trajectories Across Adolescence Among High-Risk Males, Journal of Clinical Child & Adolescent Psychology, DOI: 10.1080/15374416.2015.1102070

To link to this article: http://dx.doi.org/10.1080/15374416.2015.1102070

Published online: 22 Jan 2016.

Journal of Clinical Child & Adolescent Psychology, 00(00), 1–14, 2016

ISSN: 1537-4416 print/1537-4424 online
DOI: 10.1080/15374416.2015.1102070

Routledge
Taylor & Francis Group

Examining Predictors of Callous Unemotional Traits Trajectories Across Adolescence Among High-Risk Males

Rebecca Waller
Department of Psychology, University of Michigan

Arielle R. Baskin-Sommers
Department of Psychology, Yale University

Luke W. Hyde
Department of Psychology, Center for Human Growth and Development, and Survey Research Center of the Institute for Social Research, University of Michigan

Among high-risk youth, those with high levels of callous unemotional (CU) traits show more severe and chronic forms of antisocial behavior. Although ecological models have linked factors across multiple domains of risk to broader antisocial behavior development, fewer studies have adopted this approach in relation to understanding the unique development of CU traits. Further, a paucity of evidence exists from studies that have examined predictors of *trajectories* of CU traits. In the current study using data from the Pathways to Desistance data set, we examined prospective risk factors for CU traits trajectories modeled from ages 14 to 24. The sample included male adolescents who had interacted with the justice system (N = 1,170). CU traits were assessed using the Youth Psychopathic Traits Inventory. Risk factors were assessed at baseline via youth self-report across multiple domains of risk (individual, parenting, and broader contextual risk). Our results demonstrated higher risk factor scores across individual characteristics (higher anxiety and more substance use), parenting (higher harshness, and lower monitoring and knowledge), and broader contextual risk (more violence exposure) for youth with a "high" and stable CU traits trajectory. Adolescents with stable "high" CU traits likely need interventions capable of addressing and changing multiple aspects of their ecology across individual-, parent-, family-, and community-level targets.

Antisocial behavior (AB), including aggression and violence, is costly to society through its impact on victims, perpetrators, and families (Scott, Knapp, Henderson, & Maughan, 2001). Research has examined callous-unemotional (CU) traits (e.g., lack of empathy) as a way to identify a group of youth with severe and persistent AB (Frick, Ray, Thornton, & Kahn, 2014a). Recently, a CU traits specifier for conduct disorder diagnosis was added to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013) increasing the clinical and judicial importance of the construct and highlighting the need to establish specific risk factors for the development of CU traits. A large body of literature has demonstrated that AB is linked to individual risk, including male gender (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998) and executive function deficits (Ogilvie, Stewart, Chan, & Shum, 2011), as well as contextual risk factors, such as dysfunctional parenting (Pardini, Waller, & Hawes, 2015) and neighborhood factors (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). Models of broader AB development have benefited from adopting an ecological systems perspective (e.g., Bronfenbrenner, 1992). However, few studies have

Correspondence should be addressed to Luke W. Hyde, Department of Psychology, University of Michigan, Ann Arbor, MI48109. E-mail: lukehyde@umich.edu

applied this type of approach to understand the development of CU traits across time.

Examining Risk Factors for CU Traits at Multiple Levels

To date, the majority of research examining risk factors for CU traits has focused on examining risk factors only within single domains of risk. For example, within an individual-level risk domain, studies have demonstrated that youth with CU traits have higher heritability estimates for AB than low-CU peers (Viding, Jones, Paul, Moffitt, & Plomin, 2008) and show specific neurocognitive deficits (Blair, 2013). Recently, studies have prospectively linked parental harshness and low warmth to increases in CU traits (Waller, Gardner, & Hyde, 2013). Studies have also begun to investigate contextual risk, including neighborhood and community factors that are linked to increases in CU traits (Waller, Shaw, Forbes, & Hyde, 2015a). In the current study, rather than focusing on risk factors within one risk domain, we adopted a developmental and contextually influenced approach to understand stability in CU traits across adolescence. We were guided in selection of risk factors by those outlined in a recent large-scale review of Frick and colleagues, which delineated a host of genetic, biological, sociocognitive, temperamental, and environmental risk factors for CU traits (Frick, Ray, Thornton, & Kahn, 2014b). Because much of the previous literature has focused on the biological etiology of CU traits, however, we examined social and contextual factors that could help us to understand the maintenance of CU traits over time and identify potential malleable treatment targets.

Beyond the need to examine multiple domains of risk, a second limitation with previous studies is a focus on CU traits assessed at one time point only. Examining stability of CU traits over time may be a more valid way to understand development compared to examining "rank" or "mean" scores at one time. In one study that examined trajectories of CU traits, negative parental discipline predicted stable "high" CU traits among children assessed annually from 7 to 12 years old (Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011), although the normative nature of the sample makes it difficult to draw conclusions about whether parenting is related to trajectories of CU traits at older ages or in high-risk samples. Thus, studies are needed that examine CU traits stability particularly among youth at high risk of offending or recidivism. In addition, adolescence is a key developmental window for understanding the maintenance of CU traits, given that it is a time when personality features, whether adaptive or maladaptive, are thought to become increasingly crystalized and stable, as well as a period when youth face increasing independence and a variety of social challenges but immature regulatory systems (Arnett, 2004). Finally, the late adolescent and early adulthood period is also important developmentally, as it is a time when frequencies of AB peak (Arnett, 2004). In the current study of high-risk male adolescents, we examined risk factors that were related to membership of stable "high," "moderate," or "low" 5-year CU traits trajectories across adolescence and into early adulthood. We had already established trajectories in a previous study and found the stable high CU traits trajectory to be consequential in the prediction of future violence and substance use (Baskin-Sommers, Waller, Fish, & Hyde, 2015). Trajectories were derived within an accelerated longitudinal design with data coverage from 14 to 24 years of age, meaning that in the current study we could establish risk factors that were related to the maintenance of high and stable CU traits during a critical period pertaining to personality formation.

What Individual-Level Risk Factors are Associated with CU Traits Development?

First, we focused on potential risk factors at the level of the individual. A particular characteristic within the individual-level domain that has received focus in relation to CU traits is anxiety. Youth with CU traits are theorized to show to reduced anxiety (Frick et al., 2014a, 2014b), drawing on theory in the adult literature focusing on low anxiety as central to conceptualizations of psychopathy (Lykken, 1957). However, the direction of the relationship reported between CU traits and anxiety differs, with studies reporting anxiety to be related both to lower CU traits (e.g., Pardini, Stepp, Hipwell, Stouthamer-Loeber, & Loeber, 2012), and to higher CU traits (e.g., Berg et al., 2013). One explanation for these contrasting findings is a failure to account for concurrent AB and potential cooperative suppression (i.e., the direction of association between CU traits and anxiety is positive, until concurrent AB is accounted for, when it becomes negative; Waller et al., 2015b). A second explanation is that studies have rarely differentiated between dimensions within anxiety. In support of both of these explanations, higher levels of CU traits were shown to predict increases in anxious-depressed symptoms but not withdrawn-depressed symptoms when these two dimensions were assessed separately, and only when controlling for concurrent AB (Waller et al., 2015b). Moreover, it has yet to be established whether specific dimensions of anxiety are prospectively related to adolescent CU traits trajectories, which may be indicative of different causal pathways in the expression of CU traits. For example, and consistent with adult conceptualizations of psychopathy, high CU traits may be preceded by *low* levels of anxiety, and particularly dimensions of anxiety relating to low passive avoidance or physiological anxiety (Lykken, 1957). In contrast, CU traits may be preceded by *high* levels of anxiety reflecting social concerns or oversensitivity, which has been theorized to arise from experience of abuse and trauma (Kimonis,

Frick, Cauffman, Goldweber, & Skeem, 2012; Tatar, Cauffman, Kimonis, & Skeem, 2012). However, no previous studies have investigated whether different dimensions of anxiety (i.e., physiological anxiety, social concerns, or oversensitivity) are differentially related to later CU traits trajectories.

A second salient risk factor within the individual-level domain that has received less attention in relation to CU traits trajectories is substance use. One previous study demonstrated prospective links between CU traits and substance use among children (Wymbs et al., 2012). Moreover, our previous study in this sample demonstrated that male adolescents with stable high CU traits were at the highest risk of increases in substance use after 5-year follow-up (Baskin-Sommers et al., 2015). Thus, in the current study, we wanted to examine whether earlier substance use problems foreshadowed membership of the high CU traits trajectory group. However, the lack of empirical research examining potential prospective links between substance use and CU traits is surprising. It is theorized that youth with CU traits are at risk for substance use because of heightened reward sensitivity (Blair, 2013). An alternative possibility is that substance use is a common risk factor for both reward sensitivity and high levels of CU traits (e.g., Iacono, Malone, & McGue, 2008, p. 338), which could explain their reported overlap. Regardless of the specific time-order, a novel question in the current study was to test whether substance use was related to the maintenance of CU traits over adolescence.

Which Parenting Practices Increase Risk of CU Traits Development?

Recently, studies have also examined the influence of parenting on the development of CU traits. Parenting has been assessed across several different domains drawing on Baumrind's (1975) constructs of authoritative, authoritarian, and permissive parenting, including affective aspects of parenting (e.g., harshness, warmth) and proactive structuring of the environment (e.g., limit setting, contingency-based reinforcement, knowledge, and monitoring; Frick et al., 2014b; Waller et al., 2013). For example, prospective longitudinal studies have shown that harsh parenting (Fontaine et al., 2011; Waller et al., 2012) and low parental warmth (Waller et al., 2014) predict increases in CU traits. During adolescence, poor parent–child communication predicted the intercept and growth of latent CU traits trajectories from ages 14–18 among high-risk males (Pardini & Loeber, 2008). Salihovic, Özdemir, and Kerr (2014) also found that among low-risk males with high, stable psychopathic traits (i.e., comprising CU traits), the quality of parenting, including warmth and harshness, started lower and deteriorated more rapidly over time (Salihovic et al., 2014).

Together, these studies implicate parental harshness, warmth, monitoring, and parent–child communication as potential developmental precursors of stability in CU traits over time. In particular, harsh punishment is thought to elicit high levels of arousal, making it difficult for children to internalize parental messages about prosocial behavior and increasing risk for CU traits (Pardini, Lochman, & Powell, 2007). In contrast, positive affective aspects of parenting, including warmth, are thought to be relevant to the development and prevention of CU traits (Pardini et al., 2007; Pasalich, Dadds, Hawes, & Brennan, 2011) particularly by promoting empathy (Kochanska, 1997; Waller et al., 2014). However, studies are needed that test unique effects of different aspects of parenting (i.e., harshness, warmth, monitoring, and knowledge) in differentiating CU traits trajectories (Waller et al., 2013), which may help to identify specific parenting practices that could be intervention targets.

What Risk Factors in The Broader Contextual Domain Predict CU Traits Development?

As outlined earlier, the majority of work examining environmental risk factors for CU traits has focused on the parenting-level domain (Frick et al., 2014b). However, studies also have begun to examine risk factors at the broader contextual-level domain on the development of CU traits. It is important to establish whether individual or parenting-level risk factors predict CU traits over and above broader contextual risk, especially given well-established links between contextual risk and parenting practices (Shaw & Shelleby, 2014). Moreover, a large literature has demonstrated that exposure to community violence puts youth at risk for AB (for a meta-analysis, see Fowler et al., 2009). In relation to CU traits specifically, one previous study found that among high-risk males, early neighborhood impoverishment predicted youth CU traits at ages 10–12 even controlling for concurrent AB (Waller et al., 2015a). Further, in a nationally representative sample, the link between high CU traits and violence was strongest among youth living in low-income neighborhoods (Markowitz, Ryan, & Marsh, 2014). Taken together, these findings suggest that harsh or violent contextual risk may directly shape a personality style characterized by callousness and lack of caring, over and above effects on broader AB features. Moreover, this type of environment may expose youth to peers that model AB and encourage CU traits or it may expose youth to trauma, which has also been shown to be related to high CU traits (Kimonis et al., 2012; Tatar et al., 2012). However, no previous studies have examined the independent contributions of neighborhood disorder versus violence exposure to CU traits trajectory membership in adolescence.

CURRENT STUDY

The goal of the present analyses was to advance understanding of risk factors that differentiate CU traits trajectories from adolescence to young adulthood. As outlined and guided by recent reviews (Frick et al., 2014a, 2014b; Waller et al., 2013), risk was assessed prospectively to assessment of CU traits across three domains: *individual level* (anxiety and substance dependence), *parenting level* (harshness, warmth, monitoring, and knowledge), and broader *contextual level* (neighborhood disorder and violence exposure). Of importance, to ensure that any effects of risk factors across individual, family, and contextual levels were not attributable to CU traits simply indexing severe AB, all models in the current study included self-reported violence at baseline and 5-year follow-up. Further, we examined risk factors partialling out the variance in risk factors that have been linked to AB more broadly: race, age, and IQ, and maternal education. Based on previous research, we hypothesized that youth with low anxiety and high substance dependence, who reported experiencing dysfunctional parenting (harshness, lack of warmth, low parental monitoring, and knowledge) and disordered, violent neighborhoods, would be most likely to show stable high CU traits. Moreover, we hypothesized that these effects would be specific to CU traits, over and above more severe AB and potential influences of race, youth IQ and age, and maternal education.

METHODS

Participants

The present study used data from the Pathways to Desistance project, a multisite, longitudinal study of juvenile offenders (Schubert et al., 2004). Participants in the current study were male youth found guilty of a serious offense at a court appearance in Philadelphia, PA ($N = 605$), or Phoenix, AZ ($N = 565$). We restricted analyses to male adolescent offenders ($N = 1{,}170$), consistent with our previous study, because there was an insufficient number of female participants in the sample ($n = 184$) to obtain a stable model for deriving CU traits trajectories over 5 years (Baskin-Sommers et al., 2015). Eligibility for participation in the study included being 14–18 years of age and recently charged with a felony/serious nonfelony offense (e.g., misdemeanor weapons offense or sexual assault). A large proportion of offenses for Pathways participants were drug related, thus the proportion of male participants whose recruitment offense could be drug related was capped at 15%, which helped ensure adequate sample heterogeneity in terms of offending. Of eligible youth, 67% of located individuals who were invited to participate agreed to enroll in the study.

Procedure

Recruitment and assessment procedures were approved by the Institutional Review Boards of participating universities. Juveniles were located based on their age and adjudicated charge according to names provided by courts. Once consent was obtained, an interview appointment was made in the facility (if the juvenile was confined), the juvenile's home, or an agreed-upon location. Baseline interviews were conducted an average of 36.9 days ($SD = 20.6$) after court appearances and administered over 2 days in two separate 2-hr sessions. Interviewers and participants sat side by side facing a computer, and questions were read aloud to avoid problems caused by reading difficulties, with answers being given out loud. For questions about sensitive material (e.g., criminal behavior, substance use), answers were given via a portable keypad to ensure confidentiality. Adolescents were informed that there was a requirement for confidentiality set by the U.S. Department of Justice that prohibited disclosure of information to anyone outside the research staff, except in cases of suspected child abuse. Adolescents were paid $50 for their participation. Participants completed five further annual face-to-face interviews over the course of the study. Sample retention for the Pathways Project was high (range = 84–94%, $M = 90\%$; Schubert et al., 2004). Note that the design of the study is an accelerated, longitudinal cohort design, and thus there was a different number of participants at each age group from 14 to 18 years (at baseline; 14 years, $n = 144$; 15 years, $n = 218$; 16 years, $n = 346$; 17 years, $n = 358$; 18 years, $n = 104$), resulting in data capable of being analyzed by age or by years since recruitment. Moreover, with this design, trajectories were estimated by age resulting in data coverage from 14 to 24 years old, allowing us to examine trajectories across adolescence and into early adulthood.

Measures

Youth Outcomes—CU Traits Trajectories. CU traits were assessed via self-report using the Youth Psychopathic Traits Inventory (YPI) (Andershed, Gustafson, Kerr, & Stattin, 2002). The YPI is a 50-item measure that assesses psychopathic features on 10 subscales that map onto three domains of psychopathy: interpersonal (Grandiose-Manipulative), affective (Callous-Unemotional), and behavioral (Impulsive-Irresponsible), with each item rated on a 4-point Likert scale from 1 (*does not apply at all*) to 4 (*applies very well*). Because our goal was to examine trajectories of CU traits, we focused only on the 15 affective domain items, including items assessing callousness (e.g., "I often become sad or moved by watching sad things on TV," reverse scored), unemotionality (e.g., "I usually feel calm when other people are scared"), and remorselessness (e.g., "To feel guilty and remorseful about things you have done that have hurt others is a sign of weakness"). The YPI was

administered annually over 5 years (i.e., from ages 14–18 to 20–24). Items were written so that individuals high in CU traits would read them as reflecting positive or admirable qualities. CU traits scores showed good internal consistency (range, $\alpha = .73–.79$) and the cross-time correlation was high (average interclass $r = .85$).

Five-year CU traits trajectories were examined across six measurement points, (i.e., controlling for baseline levels) with a total accelerated longitudinal age range of 14–24 (Baskin-Sommers et al., 2015). We estimated the probability of individuals belonging to a given group and derived maximum-likelihood parameter estimates associated with membership in each of the defined trajectories (i.e., posterior probabilities of group membership). Data were tested for up to six latent classes, and the fit of different models was compared. The best trajectory solution was determined by three criteria: the lowest Bayesian Information Criterion value, posterior probabilities, and a model in which each group included at least 5% of the sample. A three-group solution for CU traits trajectories fit the data best. The estimate for entropy was .897, indicating appropriate distinction of the three trajectories. Overall, the data revealed a pattern in which CU traits were highly stable over time and youth fell into one of three relatively flat trajectory groups that did not cross. 26.5% of the sample had low, stable CU traits ("low") and 57.4% had moderate levels of CU traits across the study period ("moderate"). Finally, 16.1% of the sample showed high CU traits that remained stable and high in follow-up assessments ("high"), which we previously demonstrated to predict greater violence versatility and higher substance use at 5-year follow-up, demonstrating the usefulness of identifying trajectory groups (Figure 1; Baskin-Sommers et al., 2015).

Predictors—Individual-Level Domain (Assessed at Baseline)

Anxiety. We assessed three different dimensions of anxiety via 28 self-reported items of the Revised Children's Manifest Anxiety scale (Reynolds & Richmond, 1985), which includes a physiological anxiety subscale (10 items tapping somatic symptoms of anxiety, such as sleep difficulties, nausea, and fatigue), a Worry/Oversensitivity subscale (11 items tapping concerns and fears about being hurt or emotionally isolated), and social concerns (seven items measuring distracting thoughts and fears of a social or interpersonal nature). Given that previous studies have rarely considered how different dimensions of anxiety might differentially relate to CU traits development, we examined subscales separately.

Alcohol and Substance Dependence. We assessed dependence on alcohol and substances in the past 6 months (i.e., prior to baseline interview) via a modified version of

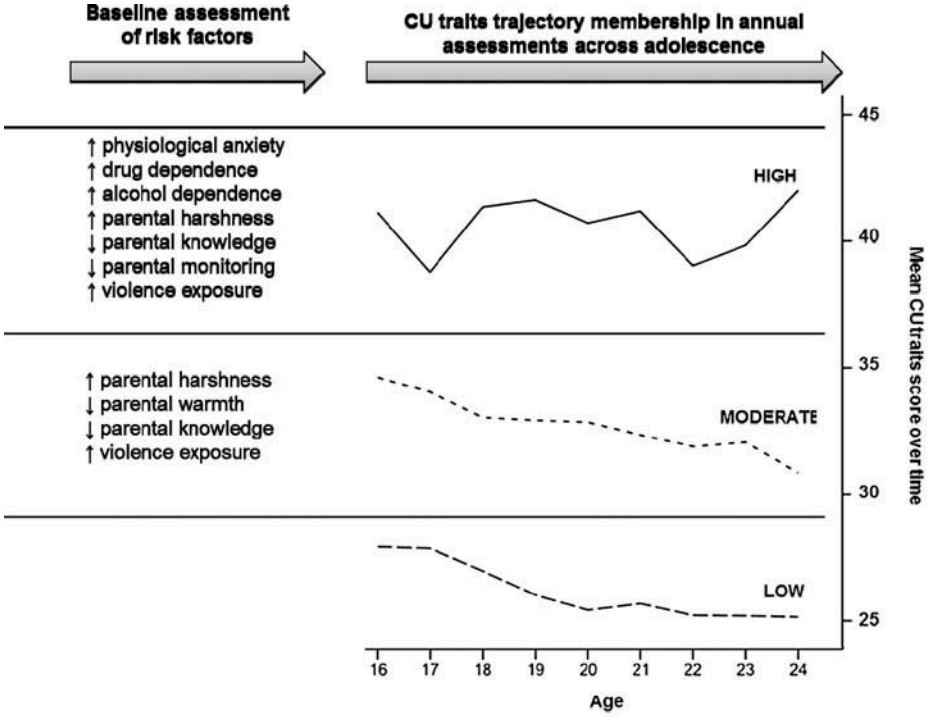

FIGURE 1 Summary of main findings in multivariate model, showing distinct experiences of risk factors across domains assessed at baseline for youth following high and moderate CU traits trajectories across adolescence. *Note*: Significant differences in risk for these groups are relative to the low CU traits group (see Table 3).

the Substance Use/Abuse Inventory (Chassin, Rogosch, & Barrera, 1991). We focused separately on items assessing adolescents' dependence on alcohol in the past 6 months versus a summed score of dependence on illicit drugs (e.g., marijuana, stimulants, cocaine, opiates, and ecstasy). We examined these variables separately to test whether there were differential effects of alcohol versus other substance dependence on CU traits trajectories.

Predictors—Parenting-Level Domain (Baseline Assessment)

Adolescents answered questions about the parenting they had experienced in the last 6-month period they spent living at home. We concentrated on youth reports of maternal harshness and warmth, for which we had the most available data. For monitoring and knowledge, a preliminary question established the identity of the individual who was responsible for the adolescent, with the majority for whom data were available identifying a biological parent (86%), and others typically identifying a female relative (e.g., aunt/grandma; 11%), sibling (1.5%), or other male relative (1.5%).

Maternal Harshness and Warmth. We used an adapted version of the Quality of Parental Relationships Inventory (Conger, Ge, Elder, Lorenz, & Simons, 1994) to measure maternal warmth (e.g., "How often does your mother let you know she really cares about you?") and maternal harshness (e.g., "How often does your mother throw things at you?"). Twenty-one items assessed the relationship on a 4-point scale ranging from *never* to *always* (Williams & Steinberg, 2011).

Parental Monitoring and Knowledge. To assess parental monitoring and knowledge, we used an adapted version of the Parental Monitoring Inventory (Steinberg, Lamborn, Dornbusch, & Darling, 1992). The scale includes nine items, five of which assess parental knowledge of the youth's activities (e.g., "How much does [your parent] know about how you spend your free time?") and four of which assess parental monitoring behaviors (e.g., "How often do you have a set time to be home on weekend nights?"; Williams & Steinberg, 2011). Items were assessed via a 4-point Likert scale: 1 (*doesn't know at all*) to 4 (*knows everything*) for the Knowledge subscale and 1 (*never*) to 4 (*always*) for the Monitoring subscale.

Predictors—Broader Contextual-Level Domain (Baseline Assessment)

Neighborhood Disorder. The Neighborhood Conditions measure was adapted for this study to assess the environment surrounding the adolescent's home (Sampson & Raudenbush, 1999). Items assessed physical disorder (e.g., "cigarettes on the street/in the gutters" and "graffiti or tags") and social disorder (e.g., "loud fighting/arguing" and "people using needles/syringes to take drugs"). The scale contains 21 items, assessed on a 4- point Likert scale from 0 (*never*) to 3 (*often*). Physical and social disorder scales were highly correlated (r = .83, p < .001), suggesting low separability; items were thus combined in a total neighborhood disorder scale.

Exposure to Community Violence. The Exposure to Violence Inventory (Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998) was modified for the Pathways study and includes six items that assess the violence an adolescent has experienced directly (e.g., "Have you ever been chased where you thought you might be seriously hurt?") and seven items assessing violence that the adolescent has witnessed (e.g., "Have you ever seen someone else being raped or an attempt made to rape someone?"). The two scales showed moderate overlap (r = .54, p < .001). We thus examined a total exposure to violence score using a mean score of all 13 items, although the results were similar when we examined the scales separately.

Covariates

Self-Reported Violent Offending. A modified version of the Self-Report of Offending scale (Mayhew & Elliott, 1990) was employed at each annual assessment (i.e., baseline and five follow-ups) to measure adolescent accounts of involvement in eight different violent crimes during the last year (fight in gang activity, assault, carjacking, robbery with weapon, robbery without weapon, shoot someone, shoot at someone, carrying a gun). Items were coded to reflect whether the respondent reported engaging in each act at least once and summed to create a "variety" score for each subject. We focused on a variety scale (vs. frequency scale), to be consistent with our previous study in this sample (Baskin-Sommers et al., 2015) and in light of research indicating that variety scales are more internally consistent and stable (Bendixen, Endresen, & Olweus, 2003). Youth in the high CU traits trajectory group reported significantly higher violence at 5-year follow-up compared to youth with moderate or low CU traits over time. Likewise, youth with moderate CU traits reported more violence than youth with low CU traits. Further, with the exception of worry/oversensitivity, baseline levels of violence were modestly related to risk factors across all domains (range, r = .08 –.23, p < .05). We included both baseline violence (i.e., concurrent to when risk factors were assessed) and violence at the 5-year assessment point (i.e., at the end point of the CU traits trajectories) as covariates to tease apart unique effects of risk factors on CU traits trajectories, over and above

violence across the study period. Internal consistency of violent offending items was excellent at baseline (α = .93) and acceptable at 5-year follow-up (α = .78; alphas for all other measures in Table 1).

Other Demographic Covariates. We included several covariates to control for other potential confounding factors that could influence membership of CU traits trajectories beyond experience of risk factors based on research examining well-established concomitants for AB (Loeber et al., 1998).

Race. Of the participants, 42% identified as African American, 34% Hispanic American, 20% Caucasian, 3% biracial, and 2% Native American; we included three recoded race variables as covariates in all models (0 = no, 1 = yes): White/Caucasian, Black/African American, and Hispanic.

Age. Age at baseline was included as covariate (M = 16.05, SD = 1.16).

Maternal education. As an index of low socioeconomic status, which has been linked to AB in the context of high CU traits (Markowitz et al., 2014), we included maternal education as a semicontinuous covariate in models, coded on a 6-point Likert scale: 1 (*some graduate school/professional qualification*; < 1%), 2 (*college graduate*; 4%), 3 (*business/trade school*; 17%), 4 (*high school diploma*; 33%), 5 (*some high school*; 33%), and 6 (*grade school or less*; 13%).

Youth IQ. We assessed youth IQ using total scores on the Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999), which includes tests of vocabulary and matrix reasoning.

Analytic Approach

The goal of the study was to examine baseline predictors of CU traits trajectories assessed over 5 years across adolescence (trajectories derived in a previous study; Baskin-Sommers et al., 2015). We computed bivariate correlations between predictor variables across risk domains: individual characteristics, parenting, and contextual risk. We computed separate analysis of covariance models to contrast trajectory groups (i.e., high vs. moderate vs. low) according to experience of risk factors, partialling out the effects of youth self-reported violence, age, race and IQ, and maternal education. Finally, we used a multivariate analysis of covariance model to contrast trajectory groups examining all risk factors simultaneously, partialling out effects of youth self-reported violence, age, race and IQ, and maternal education and examining effect sizes via partial eta squared values. This second analysis meant we could examine unique differentiation of CU traits trajectories accounting for overlap in experience of risk factors. Note that all risk factors were assessed during baseline assessments and CU trajectories were derived from five subsequent annual assessments starting 1 year after baseline assessment controlling for baseline levels of CU traits. In this way, we accounted for autoregressive effects.

RESULTS

Bivariate Association Between Risk Factors Across Domains

Descriptive statistics and bivariate correlations between study variables are presented in Table 1. Given the large sample size and use of self-report, there were expected significant correlations between risk factors (i.e., shared method variance). At the individual level, we found positive correlations between scores across anxiety dimensions. Youth with higher alcohol dependence also reported more drug dependence and anxiety. At the parenting level, as expected, there were modest–moderate correlations between parental harshness, warmth, monitoring, and knowledge, suggesting that we were assessing somewhat separable, albeit related, parenting constructs. At the broader contextual level, more neighborhood disorder was related to greater violence exposure. Across domains, more parental harshness was related to higher scores across measures of anxiety and drug and alcohol dependence, and more neighborhood disorder and violence exposure. Likewise, lower parental knowledge and monitoring were related to higher youth drug and alcohol dependence. Unsurprisingly, more neighborhood disorder and violence exposure were related to all individual level factors. Along with other zero-order correlations between risk factors (Table 1), these associations highlight overlap in experience of risk within and across domains, reinforcing the need to examine a multivariate model.

Univariate and Multivariate Models

We first computed analysis of covariance models to contrast risk factors for the CU traits groups while partialling variance in covariates (youth violence, race, IQ, age, and maternal education; Table 2). In a final multivariate analysis of covariance model, we examined risk factors from across all domains simultaneously to test whether any continued to significantly differ between the CU traits trajectories when controlling for their overlap and the effects of youth self-reported violence, race, IQ, and age, and maternal education (see Figure 1 and Table 3 for a summary of findings).

Individual Level. In both univariate and multivariate models, youth in the high group showed significantly *higher* physiological anxiety than youth in the moderate and low groups but did not differ on other anxiety dimensions (worry/oversensitivity and social concerns). Both earlier substance dependence (i.e., illicit drugs vs. alcohol

TABLE 1
Descriptives for and Bivariate Correlations Between Risk Factors Across Three Domains of Risk: Youth Characteristics, Parenting, and Contextual Risk

	Descriptive Statistics		*Bivariate Correlations*													
			Covariates			*Domain 1—Individual Level*					*Domain 2—Parenting Level*				*Domain 3—Contextual Level*	
Covariates	M (SD)	*α*	*Age*	*IQ*	*Mother Education*	*Physio. Anx.*	*Worry*	*Social Concerns*	*Substance Dep.*	*Alcohol Dep.*	*Harsh*	*Warmth*	*Monit.*	*Know.*	*Neigh. Disorder*	
Age	16.05 (1.16)															
IQ	84.47 (12.84)		−.04													
Mother Education	4.31 (1.07)		.06*	−.04												
Domain 1—Individual Level																
Physiological Anxiety	3.21 (2.21)	.66	.04	.06*	.08*											
Worry/ Oversensitivity	3.89 (2.92)	.81	.03	.05†	.16***	.58***										
Social Concerns	2.68 (1.19)	.69	.09**	.07*	.10**	.55***	.57***									
Substance Dependence	.94 (2.03)	.87	.07*	.07*	−.03	.19***	.11***	.22***								
Alcohol Dependence	.43 (1.35)	.73	.06†	.07*	.004	.17***	.09**	.16***	.50***							
Domain 2—Parenting Level																
Harshness	1.59 (.43)	.85	.12***	.07*	−.06*	.23***	.08**	.20***	.21***	.19***						
Warmth	3.25 (.67)	.92	−.06*	−.07*	.09**	−.04	.07*	−.09**	−.06†	−.04	−.34***					
Monitoring	2.68 (.80)	.70	−.27***	.03	−.04	−.05	.02	−.08**	−.15***	−.13***	−.15***	.18***				
Knowledge	1.59 (.43)	.66	−.15***	.05†	.03	−.11***	−.01	−.14***	−.21***	−.19***	−.17***	.18***	.37***			
Domain 3—Broader Contextual Level																
Neighborhood Disorder	2.35 (.74)	.94	.06*	−.08**	.10**	.17***	.11***	.12***	.05†	.06†	.12***	.01	−.11***	−.16***		
Violence Exposure	1.64 (1.47)	.67	.20***	−.02	−.02	.21***	.08*	.21***	.22***	.19***	.27***	−.05	−.26***	−.27***	.33***	

Note: Descriptive statistics for and associations between baseline and 5-year follow-up violent offending levels (including internal consistencies) and callous unemotional traits trajectory membership are reported in the Methods section. Physio. Anx. = physiological anxiety; Dep. = dependence; Monit. = monitoring; Know. = knowledge; Neigh. = Neighborhood.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

TABLE 2
Summary of Separate ANCOVA Models Examining Whether Individual Risk Factors Within Domains Differentiate CU Traits Trajectory Group Membership, Partialling Variance in Youth Violence, IQ, Race, and Age, and Maternal Education

Risk Factor Domains—Considered in Separate Models (ANCOVA)	*M (SE) Values for Different CU Traits Trajectory Group for Each Risk Factor*					
	Low	*Moderate*	*High*	*Between-Groups Test*	η_p^2	*Significant Contrasts*
Domain 1—Individual Level						
Physiological Anxiety	3.04 (.12)	3.24 (.11)	3.69 (.18)	$F = 4.53$*	.01	high > moderate* & low**
Worry/ Oversensitivity	4.04 (.16)	3.71 (.14)	3.99 (.25)	$F = 1.33$, *ns*	.003	
Social Concerns	2.61 (.10)	2.66 (.09)	2.92 (.16)	$F = 1.36$, *ns*	.003	
Drug Dependence	0.81 (.11)	0.91 (.10)	1.78 (.18)	$F = 11.67$***	.03	high > moderate*** & low***
Alcohol Dependence	.41 (.08)	.45 (.07)	0.71 (.12)	$F = 2.33^{\dagger}$	.01	high > moderate† & low*
Domain 2—Parenting Level						
Harshness	1.53 (.02)	1.61 (.02)	1.70 (.04)	$F = 8.30$***	.02	high > moderate* & low** moderate > low*
Warmth	3.32 (.04)	3.18 (.03)	3.19 (.06)	$F = 4.57$*	.01	high < low† moderate < low**
Monitoring	2.77 (.04)	2.71 (.04)	2.54 (.07)	$F = 3.96$*	.01	high < moderate* & low**
Knowledge	2.86 (.05)	2.81 (.04)	2.60 (.07)	$F = 4.52$*	.01	high < moderate* & low**
Domain 3—Broader Contextual Level						
Neighborhood Disorder	2.35 (.04)	2.31 (.03)	2.27 (.06)	$F = .75$, *ns*	.002	
Violence Exposure	5.18 (.15)	5.64 (.14)	5.82 (.24)	$F = 3.55$*	.01	high, moderate > low*

Note: Callous unemotional (CU) traits trajectory groups were derived in a previous study (Baskin-Sommers et al., 2015). General rules of thumb for effects sizes for η_p^2: small = .01; medium = .06; large = .14 (Cohen, 1977). All analysis of covariance (ANCOVA) models controlled for the following covariates: Youth self-reported violence at baseline and 5-year follow-up, race, IQ, and age, and maternal education.

*$p < .05$. **$p < .01$. ***$p < .001$. $^{\dagger}p < .10$.

dependence) also differed between groups, with the high group reporting significantly higher dependence than youth in the moderate or low groups.

Parenting Level. Within separate univariate models, all four parenting dimensions differentiated between CU traits groups. Youth in the high CU traits group reported significantly higher maternal harshness and lower parental knowledge and monitoring compared to the moderate or low youth. Youth with moderate CU traits also reported more parental harshness than youth with low CU traits—thus harshness increased incrementally and significantly across groups from low to high. Youth with low CU traits also reported higher parental warmth than youth with either high or moderate CU traits, although warmth did not differ between high and moderate groups. Within multivariate models, youth in the high CU traits group had reported significantly higher earlier parental harshness and lower monitoring and knowledge compared to the moderate and low groups. However, for warmth, a significant difference did not emerge for the high group, although youth in the moderate CU traits group had reported experiencing lower parental warmth than the low group.

Contextual Level. In both univariate and multivariate models, CU traits groups did not differ significantly in experience of neighborhood disorder. However, greater violence exposure predicted membership of the high and moderate CU traits groups. These differences in violence exposure held in multivariate models that controlled for overlap with other risk factors.

DISCUSSION

The current study adds to a growing body of literature that has sought to develop broader ecological models of CU traits development (Waller et al., 2015a). A major contribution of the findings is demonstrating that greater experience of risk at individual, parenting, and broader contextual levels is related to high CU traits across adolescence. In particular, when compared with youth in the moderate or low groups, youth following a high CU traits trajectory had higher physiological anxiety and more substance and alcohol dependence symptoms; had experienced more maternal harshness, lower parental knowledge, and monitoring; and had reported higher experience of community violence. Despite the more methodologically rigorous approach to examine risk factors across multiple domains as predictors of CU traits trajectory membership, these findings are consistent with previous studies that have examined risk factors within separate risk domains or that have assessed CU traits only at one time point.

TABLE 3
Summary of Estimates From MANCOVA Model Examining Whether Risk Factors Differentiate CU Traits Trajectory Group Membership, Controlling for the Overlap of Risk Factors and Partialling Variance in Youth Violence, IQ, Race, and Age, and Low Maternal Education

Risk Factor Domains Considered Simultaneously (MANCOVA)	*M (SE) Values for Different CU Traits Trajectory Group for Each Risk Factor*			*Between-Groups Test*	η_p^2	*Significant Contrasts*
	Low	*Moderate*	*High*			
Domain 1—Individual Level						
Physiological Anxiety	3.01 (.13)	3.20 (.11)	3.71 (.20)	$F = 4.22$*	.01	high > moderate* & low**
Worry/Oversensitivity	3.94 (.17)	3.59 (.15)	4.01 (.27)	$F = 1.65$	.004	
Social Concerns	2.56 (.11)	2.64 (.10)	2.91 (.17)	$F = 1.43$	.004	
Drug Dependence	0.81 (.12)	0.87 (.11)	2.03 (.19)	$F = 15.92$***	.04	high > moderate*** & low***
Alcohol Dependence	0.39 (.08)	0.40 (.07)	0.81 (.13)	$F = 4.57$*	.01	high > moderate** & low**
Domain 2—Parenting Level						
Harshness	1.53 (.02)	1.60 (.02)	1.70 (.04)	$F = 7.73$***	.02	high > moderate* & low*** moderate > low*
Warmth	3.32 (.04)	3.17 (.03)	3.20 (.06)	$F = 4.08$*	.01	moderate < low**
Monitoring	2.87 (.05)	2.81 (.04)	2.59 (.08)	$F = 5.04$**	.01	high < moderate* & low**
Knowledge	2.83 (.05)	2.71 (.04)	2.53 (.07)	$F = 6.41$**	.02	high < moderate* & low** moderate < low†
Domain 3—Broader Contextual Level						
Neighborhood Disorder	2.37 (.04)	2.31 (.04)	2.37 (.06)	$F = 1.23$	.003	
Violence Exposure	5.10 (.17)	5.51 (.15)	5.79 (.26)	$F = 3.05$*	.01	high > low** moderate > low†

Note: CU traits trajectory groups were derived in a previous study (Baskin-Sommers et al., 2015). The overall multivariate analysis of covariance (MANCOVA) model had a significant main effect for CU traits trajectory group membership, Wilks's $\lambda = .909$, F (22, 1490) = 3.32, $p < .001$, $\eta_p^2 = .05$. Power to detect the effect was 1.00. General rules of thumb for effects sizes for η_p^2: small = .01; medium = .06; large = .14 (Cohen, 1977). All models controlled for the following covariates: Youth self-reported violence at baseline and 5-year follow-up, race, IQ, and age, and maternal education and significant effects were robust after applying a Bonferroni correction for multiple comparisons in SPSS vs. 19.

*$p < .05$. **$p < .01$. ***$p < .001$. $^{\dagger}p < .10$.

Individual-Level Domain

Low anxiety is a characteristic that has been theorized as central to the nomological network of psychopathic and/or CU traits. In particular, low anxiety is thought to predispose individuals to a temperamental style characterized by CU traits (Frick et al., 2014a; Lykken, 1957). However, results of previous studies have been mixed, reporting that CU traits are related to higher (Berg et al., 2013) and lower anxiety (Pardini et al., 2012; Waller et al., 2015b). In the current study, we examined dimensions of anxiety separately and found that high physiological anxiety specifically differentiated youth with stable high CU traits, controlling for overlap with greater risk across parenting and broader contextual factors. One interpretation of these findings draws on the emotional-processing deficits noted among youth with high CU traits. This distinction draws on theory differentiating between primary and secondary subtypes of adult psychopathy. The primary subtype is linked to a fearlessness, deficits in processing distressing stimuli, and low anxiety. In contrast, the secondary subtype includes youth with a disinhibited temperament, experience of abuse, and high anxiety (Lykken, 1957).

In support of this distinction, studies have shown that some adolescents with high CU and/or psychopathic traits display high levels of distress, including anger, suicidal ideation, and emotional dysregulation (Fanti, Demetriou, & Kimonis, 2013; Kimonis et al., 2012; Vaughn, Edens, Howard, & Smith, 2009), especially in the context of childhood abuse (Kimonis et al., 2012). In this case, youth in our high CU traits group appear to fit definitions of secondary CU traits, displaying high physiological anxiety and having experienced greater trauma. Thus, we found some support for a specific secondary etiologic pathway to CU traits, characterized by emotion dysregulation in the context of social and environmental risk.[1] To further validate the distinction, studies are needed that follow children with a fearless temperament and emotional processing deficits

[1] As an exploratory post hoc test, we examined physiological anxiety within the high CU traits group to determine if the group mean belied primary and secondary groups. We created subgroups within the high CU traits group classifying youth who scored in the lowest 25% as low anxious ($n = 48$) and youth in the top 25% as high anxious, ($n = 45$). Providing further support for the existence of a secondary CU traits group, the high anxious, high CU traits group had experienced more neighborhood disorder ($p < .01$), and marginally greater parental harshness and lower knowledge than the low anxious, high CU traits group ($p < .10$). Results were similar if we used a median split on physiological anxiety scores to create subgroups. Nevertheless, the post hoc nature of our analyses highlight the need for future studies that examine anxiety subgroups within high CU traits youth, especially using sophisticated analytic approaches, such as model-based cluster analysis (e.g., Kimonis et al., 2012, p. 1094).

(i.e., primary) versus children who show high distress and emotional dysregulation, and who are exposed to high rates of trauma, abuse, or violence (i.e., secondary).

A second *individual-level* characteristic linked to CU traits is substance use (Wymbs et al., 2012). We found that that more symptoms of dependence on illegal substances (e.g., opiates and cocaine) and alcohol at baseline predicted membership of a stable high CU traits trajectory across adolescence. Although no previous studies have examined prospective links between substance use and adolescent CU traits, adults with psychopathy have been found to report starting using substances at younger ages (Corrado, Vincent, Hart, & Cohen, 2004). One explanation for these findings is that comorbidity in adolescence between substance use and CU traits reflects a shared heritable risk. Indeed, work among adults has demonstrated that psychopathic traits, AB, and substance use overlap at a latent level because of a shared heritable risk for externalizing traits (Blonigen, Hicks, Krueger, Patrick, & Iacono, 2005). Thus, the associations we found between substance and alcohol dependence and CU traits trajectories could have arisen because of a third unobserved variable, such as inherited impulsivity or reward seeking. Future studies are needed to test this hypothesis, as well as potential mediators of the association between CU traits, AB, and substance use over time.

Parenting-Level Domain

In line with previous studies that have highlighted the influence of parenting on the development of CU traits (Waller et al., 2013), we found that youth with stable high CU traits reported the most dysfunctional parenting, including higher harshness, and lower knowledge and monitoring. Of interest, significantly lower warmth was reported by the moderate CU traits group compared to the low group, but there was no significant difference between the warmth reported by the high group compared to the moderate or low groups. A significant strength of the current study is that these significant effects emerged in multivariate models controlling for the effects of other risk factors and taking into account youth self-reported violence, suggesting both unique effects of parenting over and above other sources of risk, and specific effects on CU traits (rather than just AB in general). By demonstrating a link between parenting practices and *trajectories* of CU traits across adolescence into adulthood, our results add to a broader literature that has begun to link parenting to CU traits development during early childhood and mid- to late adolescence in both clinic-referred and high-risk community samples (Pardini & Loeber, 2008; Salihovic et al., 2014) and over and above other related variables that could affect parenting, such as contextual and neighborhood risk (Waller et al., 2015a). It was interesting that although the highest level of parental harshness was reported by the high CU traits group relative to the moderate and low groups, the moderate group had also reported higher harshness than the low group. In this way, we found something akin to a dose-response effect with increasing harshness predicting membership of groups with increasingly high and stable levels of CU traits over time. A similar pattern emerged for parental knowledge.

Parental harshness and monitoring have consistently featured within theories of AB (Loeber et al., 1998), and our findings, along with those of other studies, suggest that parenting needs to be integrated into theories of CU traits development (see Waller et al., 2013). Both parent harshness and monitoring could be targeted in interventions that seek to reduce CU traits and AB among youth. Indeed, parenting continues to represent a useful target of intervention even among samples of high-risk adolescents. In particular, working to increase positive parent–child interactions could reduce the risk of youth following a severe trajectory of CU traits across adolescence. However, it should be noted that previous studies have also demonstrated reciprocal effects between parenting and CU traits during adolescence (e.g., Muñoz, Pakalniskiene, & Frick, 2011; Salihovic et al., 2014). Thus, our results could reflect either direct effects of parenting on CU traits or evocative effects of youth CU traits on parenting (i.e., CU traits evoking more parental harshness or lack of monitoring). Studies capable of examining cascading effects between CU traits and parenting trajectories represent a useful next research step.

Broader Contextual-Level Domain

Higher levels of exposure to violence predicted membership of both the moderate and high CU traits trajectories. Certainly these findings are consistent with broader theories of AB development that have highlighted the impact of violence victimization and witnessing violence on the development of severe and chronic AB trajectories (i.e., including individuals with high CU traits; Fowler et al., 2009; Loeber et al., 1998), as well as empirical findings linking violence exposure and abuse to the development of CU traits (Tatar et al., 2012). Exposure to community violence is thought to increase the likelihood of youth becoming uncaring and emotionally desensitized, thus with a direct effect on their AB and CU traits (Waller et al., 2015a). Further, high levels of violence in the community likely produce high numbers of aggressive and lack of prosocial role models, increasing the likelihood of reproduction/imitation of such behaviors by youth (Bandura, 1973). However, it is difficult to draw conclusions about causality or reciprocity in the links between these experiences and behavior change over time. For example, youth with high or moderate CU traits trajectories may have witnessed more violence because they were already involved in violence *perpetration*. Finally, it is noteworthy that we did not find a significant association between neighborhood disorder (i.e., social or physical decay) and CU traits trajectory group membership in either univariate or multivariate models. However, more

neighborhood disorder at baseline was related to higher violence at baseline (r = .11, p < .01) and at 5-year follow-up (r = .07, p < .05), which were both included as covariates in models. Thus, neighborhood disorder may not be direct or specific risk factor for high CU traits but rather appears to represent a nonspecific risk for AB in general.

Strengths and Limitations

There were a number of strengths to the current study, including assessment of a large, high-risk sample of male youth followed for 5 years and novel examination of prospective associations between risk factors in three domains and CU traits trajectories. At the same time, our findings should be considered alongside several limitations. First, we relied on self-report for all measures. Although youth may be the best reporters of some of these behaviors (i.e., substance use and AB), our approach may have overestimated effects through shared method biases. However, use of autoregressive effects and control for multiple overlapping variables in multivariate models may have somewhat mitigated this method bias. Although the Pathways Study does not include reports from others (i.e., parents, teachers), future studies in other studies examining prospective links between risk factors and CU traits trajectories could include objective reports or official records to avoid potential limitations associated with single reporter data collection. Second, we sought to isolate effects of risk factors on CU traits trajectories by controlling for effects of demographic covariates that have been linked to AB (Loeber et al., 1998). Thus our justification for selection of covariates was their well-established links to AB. Nevertheless, future studies are needed to isolate whether specific demographic risk factors show unique associations with CU traits versus AB more broadly. Third, because of power issues, we were unable to include female participants from the Pathways study, as we would not have been able to estimate trajectory group memberships. However, trajectories of CU traits have been investigated among a community sample of male and female participants (Fontaine et al., 2011), highlighting a need for future research in high-risk samples. Fourth, the proportion of the sample enrolled with a drug offense was capped at 15%. Thus, our findings may not generalize to other adjudicated samples of youth among whom rates of substance use may be higher. However, drug offenses are not necessarily indicative of use, meaning that many "non-substance" offenders may have had high levels of substance use, although this possibility would be difficult to evaluate within the Pathways data set. Finally, despite the large sample size and use of single-informant report, the small magnitude of effect sizes for many of the reported associations suggests only modest clinical significance of the findings. These small effect sizes highlight the need for future studies that investigate main and interactive effects of other domains of risk outside of those included in the current study but implicated in the pathophysiology and etiology of CU traits (i.e., neurobiological, genetic; Frick et al., 2014b) within an ecological systems framework.

Conclusions

The results of the present study demonstrated that higher levels of antecedent risk across the individual level (higher anxiety and substance dependence), parenting level (more harshness, and lower warmth, monitoring, and knowledge), and broader contextual level (more exposure to violence), which predicted stable high CU traits throughout adolescence and young adulthood. The current study was novel because we examined risk factors across multiple domains, adding to the handful of existing studies emphasizing the need for broader ecological models to understand the development of both CU traits and AB. Our findings help contribute to an understanding of mechanisms that increase risk for stable CU traits, with implications for broader models of AB development. Nevertheless, future research is needed to examine whether intervention efforts to reduce AB among youth with CU traits that directly target individual youth characteristics, parenting practices, and contextual sources of risk are more effective than those with one target only (e.g., parent management training; social skills training).

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Andershed, H., Gustafson, S. B., Kerr, M., & Stattin, H. (2002). The usefulness of self-reported psychopathy-like traits in the study of antisocial behaviour among non-referred adolescents. *European Journal of Personality*, *16*, 383–402. doi:10.1002/(ISSN)1099-0984

Arnett, J. J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties*. New York, NY: Oxford University Press.

Bandura, A. (1973). *Aggression: A social learning analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Baskin-Sommers, A. R., Waller, R., Fish, A. M., & Hyde, L. W. (2015). Callous-unemotional traits trajectories interact with earlier conduct problems and executive control to predict violence and substance use among high risk male adolescents. *Journal of Abnormal Child Psychology, 43*, 1529–1541. doi:10.1007/s10802-015-0041-8

Baumrind, D. (1975). *Early socialization and adolescent competence*. Oxford, England: Hemisphere.

Bendixen, M., Endresen, I. M., & Olweus, D. (2003). Variety and frequency scales of antisocial involvement: Which one is better? *Legal and Criminological Psychology*, *8*, 135–150. doi:10.1348/135532503322362924

Berg, J., Lilienfeld, S., Reddy, S., Latzman, R., Roose, A., Craighead, L., & Raison, C. (2013). The inventory of callous and unemotional traits: A construct-validational analysis in an at-risk sample. *Assessment*, *20*, 532–544.

Blair, R. J. R. (2013). The neurobiology of psychopathic traits in youths. *Nature Reviews Neuroscience*, *14*, 786–799. doi:10.1038/nrn3577

Blonigen, D. M., Hicks, B. M., Krueger, R. F., Patrick, C. J., & Iacono, W. G. (2005). Psychopathic personality traits: Heritability and genetic overlap with internalizing and externalizing psychopathology. *Psychological Medicine*, *35*, 637–648. doi:10.1017/S0033291704004180

Bronfenbrenner, U. (1992). *Ecological systems theory*. London: Jessica Kingsley.

Chassin, L., Rogosch, F., & Barrera, M. (1991). Substance use and symptomatology among adolescent children of alcoholics. *Journal of Abnormal Psychology*, *100*, 449–463. doi:10.1037/0021-843X.100.4.449

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.

Conger, R., Ge, X., Elder, G., Lorenz, F., & Simons, R. (1994). Economic stress, coercive family process, and developmental problems of adolescents. *Child Development*, *65*, 541–561. doi:10.2307/1131401

Corrado, R. R., Vincent, G. M., Hart, S. D., & Cohen, I. M. (2004). Predictive validity of the psychopathy checklist: Youth version for general and violent recidivism. *Behavioral Sciences & the Law*, *22*, 5–22. doi:10.1002/(ISSN)1099-0798

Fanti, K. A., Demetriou, C. A., & Kimonis, E. R. (2013). Variants of callous-unemotional conduct problems in a community sample of adolescents. *Journal of Youth and Adolescence*, *42*, 964–979. doi:10.1007/s10964-013-9958-9

Fontaine, N. M., McCrory, E. J., Boivin, M., Moffitt, T. E., & Viding, E. (2011). Predictors and outcomes of joint trajectories of callous–unemotional traits and conduct problems in childhood. *Journal of Abnormal Psychology*, *120*, 730–742. doi:10.1037/a0022620

Fowler, P. J., Tompsett, C. J., Braciszewski, J. M., Jacques-Tiura, A. J., & Baltes, B. B. (2009). Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. *Development and Psychopathology*, *21*, 227–259. doi:10.1017/S0954579409000145

Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014a). Annual Research Review: A developmental psychopathology approach to understanding callous-unemotional traits in children and adolescents with serious conduct problems. *Journal of Child Psychology and Psychiatry*, *55*, 532–548. doi:10.1111/jcpp.12152

Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014b). Can callous-unemotional traits enhance the understanding, diagnosis, and treatment of serious conduct problems in children and adolescents? A comprehensive review. *Psychological Bulletin*, *140*, 1–57. doi:10.1037/a0033076

Iacono, W. G., Malone, S. M., & McGue, M. (2008). Behavioral disinhibition and the development of early-onset addiction: Common and specific influences. *Annual Review of Clinical Psychology*, *4*, 325–348. doi:10.1146/annurev.clinpsy.4.022007.141157

Kimonis, E. R., Frick, P. J., Cauffman, E., Goldweber, A., & Skeem, J. (2012). Primary and secondary variants of juvenile psychopathy differ in emotional processing. *Development and Psychopathology*, *24*, 1091–1103. doi:10.1017/S0954579412000557

Kochanska, G. (1997). Multiple pathways to conscience for children with different temperaments: From toddlerhood to age 5. *Developmental Psychology*, *33*, 228–240. doi:10.1037/0012-1649.33.2.228

Loeber, R., Farrington, D., Stouthamer-Loeber, M., & Van Kammen, W. (1998). *Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence*. Mahwah, NJ: Lawrence Erlbaum Associates.

Lykken, D. T. (1957). A study of anxiety in the sociopathic personality. *The Journal of Abnormal and Social Psychology*, *55*, 6–10. doi:10.1037/h0047232

Markowitz, A. J., Ryan, R. M., & Marsh, A. A. (2014). Neighborhood income and the expression of callous–unemotional traits. *European Child & Adolescent Psychiatry, 24*, 1103–1118.

Mayhew, P., & Elliott, D. (1990). Self-reported offending, victimization, and the British Crime Survey. *Violence and Victims*, *5*, 83–96.

Muñoz, L. C., Pakalniskiene, V., & Frick, P. J. (2011). Parental monitoring and youth behavior problems: Moderation by callous-unemotional traits over time. *European Child & Adolescent Psychiatry*, *20*, 261–269. doi:10.1007/s00787-011-0172-6

Ogilvie, J. M., Stewart, A. L., Chan, R. C. K., & Shum, D. H. K. (2011). Neuropsychological measures of executive function and antisocial behavior: A meta-analysis. *Criminology*, *49*, 1063–1107. doi:10.1111/crim.2011.49.issue-4

Pardini, D. A., Lochman, J. E., & Powell, N. (2007). The development of callous-unemotional traits and antisocial behavior in children: Are there shared and/or unique predictors? *Journal of Clinical Child and Adolescent Psychology*, *36*, 319–333.

Pardini, D. A., & Loeber, R. (2008). Interpersonal callousness trajectories across adolescence: Early social influences and adult outcomes. *Criminal Justice and Behavior*, *35*, 173–196. doi:10.1177/0093854807310157

Pardini, D., Stepp, S., Hipwell, A., Stouthamer-Loeber, M., & Loeber, R. (2012). The clinical utility of the proposed DSM-5 callous unemotional subtype of conduct disorder in young girls. *Journal of the American Academy of Child & Adolescent Psychiatry*, *51*, 62–73. doi:10.1016/j.jaac.2011.10.005

Pardini, D. A., Waller, R., & Hawes, S. W. (2015). Familial influences on the development of serious conduct problems and delinquency. In J. Morizot & L. Kazemian (Eds.), *The development of criminal and antisocial behavior* (pp. 201–220). New York: Springer International.

Pasalich, D. S., Dadds, M. R., Hawes, D. J., & Brennan, J. (2011). Do callous unemotional traits moderate the relative importance of parental coercion versus warmth in child conduct problems? An observational study. *Journal of Child Psychology and Psychiatry*, *52*, 1308–1315. doi:10.1111/j.1469-7610.2011.02435.x

Reynolds, C. R., & Richmond, B. O. (1985). *Revised Children's Manifest Anxiety Scale. Manual*. Los Angeles: Western Psychological Services.

Salihovic, S., Özdemir, M., & Kerr, M. (2014). Trajectories of adolescent psychopathic traits. *Journal of Psychopathology and Behavioral Assessment*, *36*, 47–59. doi:10.1007/s10862-013-9375-0

Sampson, R., & Raudenbush, S. (1999). Systematic social observation of public spaces: A new look at disorder in urban Neighborhoods. *American Journal of Sociology*, *105*, 603–651. doi:10.1086/ajs.1999.105.issue-3

Schubert, C. A., Mulvey, E. P., Steinberg, L., Cauffman, E., Losoya, S. H., Hecker, T., … Knight, G. P. (2004). Operational lessons from the pathways to desistance project. *Youth Violence and Juvenile Justice*, *2*, 237–255. doi:10.1177/1541204004265875

Scott, S., Knapp, M., Henderson, J., & Maughan, B. (2001). Financial cost of social exclusion: Follow up study of antisocial children into adulthood. *British Medical Journal*, *323*, 1–5. doi:10.1136/bmj.323.7306.191

Selner-O'Hagan, M., Kindlon, D., Buka, S., Raudenbush, S., & Earls, F. (1998). Assessing exposure to violence in urban youth. *Journal of Child Psychology and Psychiatry*, *39*, 215–224. doi:10.1017/S002196309700187X

Shaw, D. S., & Shelleby, E. C. (2014). Early-starting conduct problems: Intersection of conduct problems and poverty. *Annual Review of Clinical Psychology*, *10*, 503–528. doi:10.1146/annurev-clinpsy-032813-153650

Steinberg, L., Lamborn, S. D., Dornbusch, S. M., & Darling, N. (1992). Impact of parenting practices on adolescent achievement: Authoritative parenting, school involvement, and encouragement to succeed. *Child Development*, *63*, 1266–1281. doi:10.2307/1131532

Tatar, J., Cauffman, E., Kimonis, E., & Skeem, J. (2012). Victimization history and posttraumatic stress: An analysis of psychopathy variants in male juvenile offenders. *Journal of Child & Adolescent Trauma*, *5*, 102–113. doi:10.1080/19361521.2012.671794

Vaughn, M., Edens, J., Howard, M., & Smith, S. (2009). An investigation of primary and secondary psychopathy in a statewide sample of incarcerated youth. *Youth Violence and Juvenile Justice*, *7*, 172–188. doi:10.1177/1541204009333792

Viding, E., Jones, A. P., Paul, J. F., Moffitt, T. E., & Plomin, R. (2008). Heritability of antisocial behaviour at 9: Do callous unemotional traits matter? *Developmental Science*, *11*, 17–22. doi:10.1111/desc.2008.11.issue-1

Waller, R., Gardner, F., & Hyde, L. W. (2013). What are the associations between parenting, callous–unemotional traits, and antisocial behavior in youth? A systematic review of evidence. *Clinical Psychology Review*, *33*, 593–608. doi:10.1016/j.cpr.2013.03.001

Waller, R., Gardner, F., Hyde, L. W., Shaw, D. S., Dishion, T. J., & Wilson, M. N. (2012). Do harsh and positive parenting predict parent reports of deceitful callous behavior in early childhood? *Journal of Child Psychology and Psychiatry*, *53*, 946–953. doi:10.1111/jcpp.2012.53.issue-9

Waller, R., Gardner, F., Viding, E., Shaw, D. S., Dishion, T. J., Wilson, M. N., & Hyde, L. W. (2014). Bidirectional associations between parental warmth, callous unemotional behavior, and behavior problems in high-risk preschoolers. *Journal of Abnormal Child Psychology*, *42*, 1275–1285. doi:10.1007/s10802-014-9871-z

Waller, R., Shaw, D. S., Forbes, E. E., & Hyde, L. W. (2015a). Understanding early contextual and parental risk factors for the development of limited prosocial emotions. *Journal of Abnormal Child Psychology*, *43*, 1025–1039. doi:10.1007/s10802-014-9965-7

Waller, R., Wright, A. G., Shaw, D. S., Gardner, F., Dishion, T. J., Wilson, M. N., & Hyde, L. W. (2015b). Factor structure and construct validity of the parent-reported inventory of callous-unemotional traits among high-risk 9-year-olds. *Assessment*, *22*, 561–580. doi:10.1177/1073191114556101

Wechsler, D. (1999). *Wechsler Abbreviated Scale of Intelligence*. New York: Psychological Corporation.

Williams, L. R., & Steinberg, L. (2011). Reciprocal relations between parenting and adjustment in a sample of juvenile offenders. *Child Development*, *82*, 633–645. doi:10.1111/cdev.2011.82.issue-2

Wymbs, B., McCarty, C., King, K., McCauley, E., Vander Stoep, A., Baer, J., & Waschbusch, D. (2012). Callous-unemotional traits as unique prospective risk factors for substance use in early adolescent boys and girls. *Journal of Abnormal Child Psychology*, *40*, 1099–1110. doi:10.1007/s10802-012-9628-5