The Roles of Affect Dysregulation and Deficient Affect in Youth Violence

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Introduction

Aggressive and antisocial youth demonstrate substantial heterogeneity along several important dimensions. Not only do they differ in the types of aggression they display (e.g., overt vs. covert behaviors; Coie & Dodge, 1998), but they also vary according to the age of onset and chronicity of their antisocial behaviors (e.g., life course persistent versus adolescent limited; Moffitt, 2006). Importantly, children differ with respect to the risk factors and etiological mechanisms that contribute to the onset, manifestation, and developmental course of problem behaviors (Burke, Loeber, & Birmaher, 2002; Loeber & Stouthamer-Loeber, 1998).

Recent reviews of the literature point to affect regulation as a salient risk factor in aggression among children and adolescents (Izard et al., 2008; Mullin & Hinshaw, 2007). Much of this research focuses on the relation between underregulated or "dysregulated" emotions of negative valence and aggression. For instance, negative reactivity, defined as the "tendency to react strongly and consistently to environmental events with emotions of negative valence" (Frick & Morris, 2004, p. 58), has been associated with aggressive conduct problems among children (Caspi, 2000; Eisenberg et al., 1997; Hubbard et al., 2002). Alongside studies demonstrating a positive association between affect dysregulation and aggression is a growing body of research showing both concur-rent (Frick, Cornell, Bodin, et al., 2003; Loney, Frick, Clements, Ellis, & Kerlin, 2003; Raine, 2002) and prospective (Frick, Cornell, Barry, Bodin, & Dane, 2003) relations between low emotional reactivity and aggression. Abnormally low levels of emotional reactivity are also implicated in psychopathy, a personality syndrome that encompasses a constellation of affective, interpersonal, and behavioral characteristics, such as a callous disregard for others, a lack of empathy, and a propensity toward highly impulsive and irresponsible behaviors (Hare,

2003). In particular, the affective characteristics of psychopathy (i.e., callousness, remorselessness, and superficial emotions, collectively referred to as deficient affect; Cooke & Michie, 2001) are believed to stem from a temperamental style characterized by low emotional reactivity and relative fearlessness to novel or aversive stimuli (Frick, Cornell, Bodin, et al., 2003; Frick & Ellis, 1999).

These differing affective presentations may constitute an important type of heterogeneity among aggressive and antisocial youth. The primary goal of this research was to examine whether there are two types of affect-based risk factors associated with aggression in youth: one that occurs through a failure to achieve adequate modulation of affective states (affect dysregulation) and another that arises through the lack of sufficient affective reactivity to provoke the inhibition of aggressive and antisocial behaviors (deficient affect).

Affect Regulation: Definition & Measurement

The regulation of affect is a major developmental achievement that has significant implications for psychological adjustment and emotional competence (Cicchetti, Ganiban, & Barnett, 1991; Cole, Michel, & Teti, 1994). Developmental approaches to behavioral disorders have frequently emphasized the role of emotions, such as anger and anxiety, and associated regulatory abilities. Similarly, in the adult literature, difficulties regulating negative affect have been implicated in a range of psychological disorders, including the majority of non-substance-related Axis I disorders and virtually all of the personality disorders (Gross & Levenson, 1997).

Researchers have defined the construct of affect regulation in varying ways, although there are conceptual similarities across definitions. Eisenberg and colleagues (Eisenberg, Fabes, Guthrie, & Reiser, 2000) define affect regulation as "the process of initiating, maintaining, modulating, or changing the occurrence, intensity, or duration of internal feeling states and

emotion-related physiological processes, often in the service of accomplishing one's goals" (p. 137). Adaptive affect regulation has also been conceptualized as the ability to monitor and/or alter one's level of arousal so as to engage in flexible, strategic, and effective behaviors (Pope & Bierman, 1999; Shields & Cicchetti, 1998). The distinctiveness and significance of affect regulation is also evident in models of behavioral impulsivity. Researchers typically distinguish affect regulation from behavioral inhibition but also acknowledge the intricate relationship between these two facets of functioning (Eisenberg et al., 2000). Indeed, some researchers have suggested that behavioral impulsivity maybe an important moderator of the relationship between affect regulation and aggression (Whiteside & Lynam, 2001).

Affect regulation is also typically conceptualized as multidimensional. Gross and John (1998, 2003) identified distinct affect regulation strategies (e.g., cognitive reappraisal, expressive suppression) and showed that certain strategies are more adaptive than others with respect to emotional and psychosocial functioning. Other studies have substantiated the divergent validity of different regulatory strategies, finding that dysregulated expression (i.e., the undercontrol of aversive emotional experiences) and suppression (i.e., the inhibition of emotional experiences) are associated with negative outcomes as compared to the effective management of negative affect (Phillips & Power, 2007; Shields & Cicchetti, 1997; Zeman, Shipman, & Penza-Clyve, 2001). Affect dysregulation and suppression also show distinct correlates: Whereas dysregulation has been linked with aggression and externalized behaviors, suppression has been associated with depression and other internalizing problems (Gross & John, 2003; Silk, Steinberg, & Morris, 2003).

The Role of Affect Dysregulation In Aggression and Developmental Psychopathology

Recent conceptualizations of child and adolescent psychopathology link affect

dysregulation with externalizing behavior problems (Dearing et al., 2002; Lahey et al., 1999; Mullin & Hinshaw, 2007). In particular, previous research highlights the importance of regulating negative emotional expressions in children's social functioning, with displays of negative affect predicting aggressive and undercontrolled behaviors in social situations (Calkins, Gill, Johnson, & Smith, 1999; Rubin, Coplan, Fox, & Calkins, 1995). Within a normative sample, Eisenberg and colleagues (2001) found that internalizing and externalizing problems among school-age children could be differentiated in terms of patterns of dispositional negative emotionality (i.e., anger, sadness, and fear) as well as behavioral and attentional regulation; specifically, children with externalizing problems were characterized by low attentional and behavioral regulation (e.g., attention focusing, inhibitory control) as well as increased anger proneness. Caspi and colleagues (Caspi, 2000; Caspi, Henry, McGee, Moffitt, & Silva, 1995) demonstrated prospective relations between temperamental characteristics related to affect regulation (e.g., dysregulated emotional expression, emotional lability) and externalizing behavior problems. In a sample of community-dwelling adolescents, the frequent use of dysfunctional affect regulation strategies (e.g., rumination, suppression, taking out emotions verbally or physically) was related to increased severity of emotional symptoms, conduct problems, hyperactivity, and peer problems (Phillips & Power, 2007).

A smaller body of research investigating affect regulation in adolescents at risk for aggressive and delinquent behaviors (e.g., de Castro, Merk, Koops, Veerman, & Bosch, 2005; Lochman & Dodge, 1994; Shields & Cicchetti, 1998) suggests that highly aggressive youth possess few adaptive emotion regulation strategies, exhibit high levels of emotional arousal, and are highly reactive to the distress of others. In the study conducted by de Castro and colleagues (2005), boys referred for problems with aggression mentioned less effective affect regulation

strategies (e.g., using distraction, or further aggression in response to negative affect) than did their nonaggressive counterparts and were less likely to identify any strategy that could be used to regulate their emotions (in this case, anger and sadness). The work of Frick and colleagues (e.g., Frick, Cornell, Bodin, et al., 2003; Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Loney et al., 2003) has also demonstrated significant relations between heightened emotional reactivity, behavioral impulsivity, and aggressive conduct problems within samples of at-risk children and adolescents. In contrast to youth showing "callous-unemotional" (CU) traits, such as a lack of guilt, impaired empathy, and constricted emotions, delinquent youth without such features showed higher levels of anxiety and responsivity to negative emotional stimuli (Frick, Cornell, Bodin, et al., 2003; Loney et al., 2003).

The Role of Deficient Affect in Psychopathy

Researchers have long argued that deficiencies in specific emotional capacities, such as remorse and empathy, lie at the core of the psychopathy syndrome (Blackburn, 1998; Hare, 1998). Cleckley (1941, 1976) theorized that the majority of psychopathic symptoms were the result of a deep-seated affective deficit, manifesting in personality traits such as callousness, a lack of empathy and remorse, and shallow emotional responses. Evidence for this claim comes from studies showing that individuals with high scores on validated psychopathy measures show reduced physiological responses to aversive stimuli, suggesting that the affective deficits manifested by psychopaths may be mediated by biological processes (Benning, Patrick, & Iacono, 2005; Kiehl et al., 2001; Verona, Patrick, Curtin, Bradley, & Lang, 2004).

Some have argued further that deficiencies in emotions such as fear and anxiety may be evident early in development and that the study of such markers may help to better under-stand the development of psychopathy in adulthood. On the basis of the finding that CU traits

evidenced considerable heritability in recent twin studies, some researchers have suggested that the affective features of psychopathy may be genetically mediated (Larsson, Andershed, & Lichtenstein, 2006; Taylor, Loney, Bobadilla, Iacono, & McGue, 2003; Viding, Blair, Moffitt, & Plomin, 2005). The affective features of psychopathy are also thought to signal a more severe subgroup among the more heterogeneous population of aggressive and antisocial youth with respect to behavioral and emotional problems (Barry et al., 2000). Recent studies have supported this claim, showing that elevated CU traits in children are associated with reduced sensitivity to punishment cues and emotionally distressing stimuli (Frick, Cornell, Bodin, et al., 2003; Kimonis, Frick, Fazekas, & Loney, 2006). Indicators of callousness, deficient empathy, and decreased emotional reactivity in children are also associated with a greater variety of antisocial behaviors as well as thrill-seeking activities (Christian, Frick, Hill, & Tyler, 1997; Frick, Cornell, Barry, et al., 2003; Frick, Cornell, Bodin, et al., 2003). In older adolescents, features of deficient affect predict overt and relational aggression (Penney & Moretti, 2007) as well as antisocial behaviors (Vincent, Vitacco, Grisso, & Corrado, 2003).

Alongside the affective features described previously, the wide range of interpersonal and behavioral traits encompassed by psychopathy allows for recognition of heterogeneity across individuals identified with psychopathy and has resulted in a sizeable literature on psychopathy subtypes in an attempt to identify phenotypically similar groups (e.g., Hicks, Markon, Patrick, Krueger, & Newman, 2004; Newman, MacCoon, Vaughn, & Sadeh, 2005; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). The distinction between primary and secondary psychopathy is of relevance to the current discussion. In this regard, research shows that not all psychopathic individuals present with features of deficient affect, despite the fact that these characteristics are regarded as central to the adult syndrome. Primary psychopaths are

typically described as deficient in emotional expression and the capacity for empathy, whereas secondary psychopaths not only possess classic psychopathic features but also show high levels of negative emotional arousal, anxiety, and stress (Karpman, 1948; Skeem et al., 2003).

The distinguishing features of primary and secondary psychopathy dovetail with the differences that have been noted among children with and without CU traits. Children with CU features show specific behavioral and psychophysiological features consistent with the literature on primary psychopathy, such as a reward-dominant response style and a reduced sensitivity to cues of punishment and threatening or emotionally distressing stimuli (Blair, 1999; Frick, Cornell, Bodin, et al., 2003). In contrast, consistent with descriptions of secondary psychopathy, conduct-disordered children without CU features show elevated emotional reactivity, anxiety, and attention-related problems (Barry et al., 2000; Frick, O'Brien, Wootton, & McBurnett, 1994; Loney et al., 2003). Thus, the literatures on affect regulation and psychopathy both underscore the salience of deficient affect and dysregulated negative affect in the development of aggression and antisociality.

Aggression: A Multidimensional Construct

Prior research has distinguished various forms of aggression with distinct correlates and developmental outcomes (e.g., Dodge & Coie, 1987; Little, Jones, Heinrich, & Hawley, 2003). For instance, reactive aggression relates to sympathetic arousal and angry reactivity and has been associated with peer rejection and victimization (Kempes, Matthys, deVries, & van Engeland, 2005), social withdrawal (Poulin & Boivin, 2000), and a hostile attribution bias (Crick & Dodge, 1996). In contrast, instrumental aggression is described as methodical and premeditated and has been linked not only to popularity, social status, and leadership (Kempes et al., 2005; Poulin & Boivin, 2000) but also to bullying, violence, and delinquency (Brendgen,

Vitaro, Tremblay, & Lavoie, 2001; Roland & Idsoe, 2001). A recent meta-analysis by Card and Little (2006) found that reactive aggression was more strongly associated with internalizing problems, affect dysregulation, and low social preference than was instrumental aggression.

In light of these findings, we may expect affect dysregulation to be more strongly associated with reactive, rather than instrumental, aggression, whereas the opposite may be true of deficient affect. Persistent and dysregulated affect, including anger, is likely to increase affect intensity and reactive anger expression as well as other antisocial behaviors (Loeber, Tremblay, Gagnon, & Charlebois, 1989). In contrast, premeditated aggression appears to require a higher degree of emotional and behavioral control to be carried out successfully (Ellis, Weiss, & Lochman, 2009). Although reactive and instrumental aggression appear distinct and relate to different psychosocial correlates, they are also highly correlated in most samples. As noted by several researchers, acts of aggression often contain elements of both instrumentality and emotionality-reactivity (e.g., Cornell et al., 1996; Poulin & Boivin, 2000). For this reason, it is important for researchers to use appropriate statistical techniques that disentangle the unique from common features of reactive and instrumental aggression. In addition, further research is required to determine divergent validity in the relationships of these two forms of aggression to conceptually relevant variables, such as affect dysregulation and deficient affect.

The Current Study

A large body of research demonstrates that compromised affect regulation skills in children coupled with heightened negative reactivity is a risk factor for a range of behavioral and psychosocial dysfunctions (Gross & Muñoz, 1995; Larsen, 2000). By contrast, studies have also demonstrated that deficiencies in empathy and low levels of emotional reactivity are associated with aggression (Frick, Cornell, Bodin, et al., 2003). These lines of research suggest

that affect dysregulation and deficient affect may be discrete risk factors for aggressive and antisocial behaviors.

Although distinct, an alternative viewpoint has been proposed by Eisenberg and colleagues (Eisenberg et al., 1996; Eisenberg, Cumberland, & Spinrad, 1998) and others (e.g., Frick & Morris, 2004). These researchers argue that the dysregulation of negative affect and deficits in empathy are two developmentally related expressions of maladaptive affect regulation. They propose that when some children experience intense emotional arousal that they are unable to regulate effectively, they are more likely to experience the emotions of others as aversive and overwhelming. Over time, their emotional over-arousal leads them to focus on themselves rather than others, a response that is incompatible with interpersonal empathy (Eisenberg et al., 1996, 1998) and that can eventually lead to a chronic deactivation of the affective system in social interaction.

In light of these varying hypotheses, an important question is whether the dysregulation of negative affect and features of deficient affect are separate regulatory problems related to aggression. If they are indeed distinct problems, they may relate meaningfully to groups of aggressive youth with different etiological and risk profiles (Loeber & Stouthamer-Loeber, 1998). Furthermore, different types of affect regulation problems may underlie reactive versus instrumental aggression.

In this study, we assessed the concurrent and prospective relations of affect dysregulation and deficient affect to reactive and instrumental aggression. On the basis of the literature reviewed earlier, we predicted that affect dysregulation would relate more strongly to reactive aggression as compared to deficient affect. In contrast, we expected that deficient affect would relate more strongly to instrumental aggression as compared to affect dysregulation. We

also examined relations to violent and nonviolent delinquency to test the degree of specificity in our predicted outcomes and to evaluate whether affect dysregulation and deficient affect are meaningfully related to all forms of antisocial behavior or only those acts involving violence. We measured violent and nonviolent reoffending at a 2-year follow-up via self-report and official records. Last, we examined whether affect dysregulation and deficient affect represent distinct risk factors by measuring their shared variance across all models.

Method

Participants and Procedure

Participants at Time 1 were 179 adolescents (97 males, 82 females) between the ages of 12 and 18 (M = 15.3, SD = 1.5) drawn from a maximum- (28%) and minimum-security (25%) custody center, a mental health assessment center (45%), and probation offices (2%) in western Canada. There were comparable proportions of male and female youth across the two custody sites (53 males, 46 females) and assessment center (44 males, 36 females). The ethnic composition of the sample included 66% (n = 118) Caucasians, 23% (n = 41) Aboriginals, and 11% (n = 20) youth of other ethnicity. Seventeen percent of youth had at least one prior contact with the mental health system, and 53% had one or more prior entries into the correctional system. Thirty-eight percent stated that they were not currently under the legal care of their biological parents (the most common legal guardians listed were extended family members, foster parents, and social workers).

One hundred thirty-two youth in custody were invited to participate. Of these, parents or legal guardians refused consent for 28 youth (21%), 5 youth refused consent (4%), and 1 withdrew partway through the study (<1%). In the non-offender sample (i.e., youth from the mental health assessment center), we invited 102 youth to participate. Of these, 19 youth

refused consent (19%) and 2 withdrew partway through the study (2%). All females admit-ted to custody or the mental health center were invited to participate in the study, and male participants were matched to the age of female participants. The gender and age composition of those youth who did not participate was not significantly different from the youths who consented to participate: for gender, c2 = .31, $p > .05$; for age, $F(1, 226) = .78$, $p > .05$. Exclusionary criteria were (a) an IQ below 70 and/or (b) Axis I psychotic symptomatology.

This study was ethically approved by the host university and institutional review boards prior to commencement. Both youth and their legal guardians provided informed consent for participation. Youth who consented to participate completed individual assessments comprising semistructured clinical interviews, computerized diagnostic assessments, and self-report measures. They received either $30 (residential and outpatient youth) or snacks during testing and $10 after completion of the protocol (incarcerated youth). They were informed that their responses to all questionnaires would be kept confidential to the extent provided under the law (i.e., disclosures of intended self- or other harm would result in a breach of confidentiality).

Self-report follow-up data were collected via phone interview at least 22 months from the youth's Time 1 participation ($M = 26.3$, $SD = 4.0$). Consent to participate was again secured from youth and their legal guardians. Follow-up assessment included several self-report questionnaires administered at Time 1 in addition to supplementary questions regarding mental and physical health. One hundred youth (49 males, 51 females) completed the follow-up phone interview, representing 56% of the original sample. Attrition was primarily related to difficulties in tracking youth (e.g., obtaining current contact information, particularly for those youth who had moved outside of the province) rather than refusal to participate (only 2 youths refused to participate). Analyses of data from Time 1 did not reveal significant differences on

demographic variables (i.e., age, ethnicity) or on study variables (i.e., affect dysregulation, deficient affect, aggression) between youth who had versus had not completed a follow-up interview at Time 2. Official arrest data were collected for the entire sample exactly 24 months following Time 1. At this time, a total of 51 youth (29%) had been charged with one or more new violent offenses, and 87 youth (49%) had been charged with at least one new nonviolent offense. Approximately half of the sample (53%) had spent fewer than 30 days in custody during the follow-up window, and 75% had spent fewer than 6 months in custody.

Measures

Means and standard deviations for each measure described below are presented in Table 1.

Affect Regulation Checklist (ARC; Moretti, 2003). TheARC is a 12-item self-report scale designed to measure three components of affect regulation: dyscontrol (e.g., "I have a hard timecontrollingmyfeelings";"MyfeelingsjusttakeovermeandIcan't doanythingaboutit"), suppression (e.g., "I try hard not to think about my feelings"), and reflection (e.g., "Thinking about why I have different feelings helps me to learn about myself").

Results from confirmatory factor analyses supported a three-factor solution for the ARC, comparative fit index (CFI) = .93, root mean square error of approximation (RMSEA) = .06, versus both a one-factor (CFI = .45, RMSEA = .18) and a two-factor (CFI = .83, RMSEA = .10) solution. Internal reliabilities of each factor were satisfactory, Cronbach's alpha = .81, .65, and .80 for the dyscontrol, suppression, and reflection factors, respectively. All items are scored on a 3-point scale ranging from *not like me* to *a lot like me*. A subset of items was adapted from published scales of affect regulation (Gross & John, 1998, 2003; Shields & Cicchetti, 1998), and others were developed to tap the three factors. Consistent with other studies, the ARC represents a multidimensional view of affect regulation that includes both maladaptive (lack of

control, suppression) and adaptive (reflection) strategies. The present study focused on the first subscale of the ARC (Dyscontrol), as it is most consistent with definitions of maladaptive affect regulation provided in the literature (e.g., Gross & John, 1998; Shields & Cicchetti, 1998).

TABLE 1: Means and Standard Deviations of Measures Employed at Time 1 and Time 2

	Males				*Females*			
	Time 1		*Time 2*		*Time 1*		*Time 2*	
Variable	M	SD	M	SD	M	SD	M	SD
Dysregulation (ARC Dyscontrol)	3.59	2.5	—	—	4.12	2.4	—	—
Deficient affect (PCL:YV)	4.58	1.6	—	—	3.66	2.1	—	—
Reactive aggression (FFAM)	9.88	3.5	9.88_{a}	3.5	9.65	3.6	8.22_{b}	3.1
Instrumental aggression (FFAM)	7.92	3.6	6.56	2.0	7.94	3.8	6.27	2.5
Violent offenses (SRO-R)	2.42_{a}	2.1	$2.16_{a}^{\dagger}$	2.2	1.79_{b}	1.8	$.73_{b}^{\dagger}$	1.2
Nonviolent offenses (SRO-R)	2.55	1.9	$2.36_{a}^{\dagger}$	1.7	2.27	1.9	$1.35_{b}^{\dagger}$	1.6
Official violent offenses	—	—	$1.04^{\dagger}$	2.1	—	—	$.73^{\dagger}$	1.7
Official nonviolent offenses	—	—	$3.66_{a}^{\dagger}$	5.0	—	—	$1.24_{b}^{\dagger}$	3.5

Note. ARC = Affect Regulation Checklist (Moretti, 2003); PCL:YV = Psychopathy Checklist: Youth Version (Forth, Kosson, & Hare, 2003); FFAM = Form-Function Aggression Measure (Little, Jones, Heinrich, & Hawley, 2003); SRO-R = Self-Report of Offending, Revised (Huizinga, Esbensen, & Weiher, 1991). Minimum and maximum scores for each of the scales are as follows: 0 to 8 (dyscontrol, deficient affect, reactive aggression), 0 to 10 (instrumental aggression), 0 to 5 (nonviolent offenses), 0 to 6 (violent offenses), 0 to 11 (official violent offenses), and 0 to 25 (official nonviolent offenses). Means in the same row that do not share subscripts differ at $p < .01$ (a, b).
†These figures represent the number of different violent and nonviolent offenses engaged in during the past 24 months only.

*PsychopathyChecklist:YouthVersion(PCL:YV;Forth,Kosson,&Hare,2003).*ThePCL:YV is a 20-item symptom construct rating scale designed to measure the interpersonal, affective, and behavioral dispositions in youth parallel to the adult version of the measure, the Psychopathy Checklist–Revised (PCL-R; Hare, 2003). Each item is scored on a 3-point scale of trait presence and severity (0, *consistently absent*; 1, *inconsistently present*; 2, *consistently present*). Results from confirmatory factor analyses published in the PCL:YV manual (Forth et al., 2003) support both the three-factor (Cooke & Michie, 2001) and two-factor/four-facet (Hare, 2003) models of psychopathy. Analysis for the current study was guided by the hierarchical three-factor model of psychopathy (Cooke & Michie, 2001). This model posits a superordinate factor, psychopathy, with three separate subfactors: arrogant and deceitful interpersonal style, deficient affective experience (DAE), and impulsive and irresponsible

behavioral style. The current study used Factor 2 of the PCL:YV (DAE) as a measure of deficient affect. This factor comprises four items: lacks remorse, shallow affect, callousness–lacks empathy, and failure to accept responsibility.

Semistructured interviews were conducted by three graduate students with training in the administration and coding of the PCL:YV[1]. Collateral sources of information, including psychosocial histories, presentencing and disposition reports, and psychological assessments, were also used for coding. Using single-rater intraclass correlation coefficients (ICC1) for a two-way random effects model for absolute groups, we determined that interrater reliability was satisfactory for PCL:YV total score for file-only training cases (.87; $n = 5$). For interview cases ($n = 28$), the ICC for PCL:YV total score was .96. For the factor scores, the coefficients ranged as follows: Factor 1 = .93, Factor 2 = .90, and Factor 3 = .84.

Form-Function Aggression Measure (FFAM; Little et al., 2003). The FFAM is a self-report measure designed to separate and assess the forms (i.e., overt, relational) and functions (i.e., instrumental, reactive) of aggression. Items on the FFAM are based directly on other published measures of aggression (Crick, 1997; Dodge & Coie, 1987). All items are scored on a 4-point scale ranging from *not true at all* to *completely true*. Little and col-leagues (2003) reported acceptable levels of internal validity as well as satisfactory external and criterion validity for the scale, which was shown to generalize across age, gender, and ethnicity. The current study focused on reactive and instrumental forms of overt aggression (e.g., “When I am hurt by someone, I often fight back”; “I often threaten others to get what I want”).

Self-Report of Offending, Revised (SRO-R; Huizinga, Esbensen, & Weiher, 1991). The SRO-R adapted for use in this study is based on the more widely studied Self-Report of Delinquency (see Huizinga & Elliot, 1986; Piquero, MacIntosh, & Hickman, 2002). This scale

has been shown to produce results consistent with official measures of delinquency and has demonstrated functional invariance across gender and ethnicity (Knight, Little, Losoya, & Mulvey, 2004). The current measure included 15 items, largely comparable to those found in large-scale high-risk and normative studies, assessing the youth's lifetime (Time 1) and current (past 24 months; Time 2) involvement in violent and nonviolent offenses.

Official arrest data. Official arrest data (i.e., charges and convictions) were accessed through the Ministry of Children and Family Development official records system in Canada (CORNET) 24 months following Time 1 and were coded for violent (e.g., assault, sexual offenses) and nonviolent (e.g., drugs, theft) recidivism.

Analytic Strategy

Structural equation modeling (SEM) was used to evaluate the joint effects of affect dysregulation and deficient affect in predicting aggression, violence, and delinquency. SEM provides a confirmatory approach to data analysis in which multiple sets of regression equations can be tested simultaneously, allowing one to test complex models involving a large number of linear relations (Tomarken & Waller, 2005). The relations between latent variables and their manifest indicators (the measurement model) may be separately estimated from the hypothesized relations among latent constructs (the structural model). Consequently, the associations among constructs are corrected for biases stemming from construct-irrelevant variance and measurement error associated with the observed variables.

All models were fit to the data using Mplus Version 3.1 (Muthén & Muthén, 2004), and analyses were performed using robust weighted least squares estimation with a mean- and variance-adjusted chi-square algorithm (WLSMV, or robust WLS).2 Models were evaluated according to suggested critical values for commonly used fit indices (i.e., CFI > .95, Tucker-

Lewis index [TLI] > .95, RMSEA < .06; Hu & Bentler, 1999). When categorical variables are used, another important indicator of model adequacy is the weighted root mean square residual, which measures the weighted average differences between the sample and estimated population variances and covariances and for which values <.90 are recommended (Yu & Muthén, 2002).

Results

Concurrent Relations to Aggressive and Antisocial Behaviors

The joint effects of affect dysregulation and deficient affect were tested by simultaneously regressing reactive and instrumental aggression (or violent and nonviolent offenses) onto the dysregulation and deficit constructs. To evaluate whether affect dysregulation and deficient affect show differential relations to the different types of aggression or offenses, nested chi-square difference tests were carried out to assess the relative loss in fit when moving from a model in which the effects of affect dysregulation and deficient affect are free to vary across the dependent variables to one where these relations are constrained to be equal. In all cases, affect dysregulation and deficient affect were allowed to covary, and all latent variables were standardized by constraining one factor loading per latent variable equal to one. Age was included as a covariate in all of the models. The variable reliabilities and intercorrelations are shown in Table 2.

The model estimating the effects of affect dysregulation and deficient affect on reactive and instrumental aggression represented an excellent fit to the data (Figure 1) and accounted for 48% and 37% of the variance in reactive and instrumental aggression, respectively. Results were similar when predicting the number of offenses a youth had engaged in (Figure 2), and this model accounted for 45% and 49% of the variance in violent and nonviolent offenses, respectively. With respect to the measurement portion of the models, each of the indicator

variables demonstrated significant loadings on their respective latent constructs. The only exception to this was seen for PCL:YV Item 7 (shallow affect); the standardized parameter estimate for this item was nonsignificant in the model predicting violent and nonviolent offenses (l = .12, p = .16), suggesting that this item is a less reliable indicator of the deficient affect construct. Affect dysregulation and deficient affect each evidenced significant associations with reactive (b = .45 and .53, p < .01, for dysregulation and deficit, respectively) and instrumental (b = .37 and .49, p < .01, for dysregulation and deficit, respectively) aggression, whereas only deficient affect showed a significant relation to violence (b = .52, p < .01) and delinquency (b = .46, p < .01). In both models, the bivariate association between the dysregulation and deficient affect latent variables was minimal and nonsignificant (r=.06).

TABLE 2: Reliabilities and Intercorrelations Among Exogenous and Endogenous Variables

Variable (Time 1)	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*α*
1. Dysregulation	—												.81
2. Deficient affect	.05	—											.65
3. Reactive aggression	.35**	.42**	—										.85
4. Instrumental aggression	.31**	.38**	.59**	—									.91
5. Violent offenses	.08	.37**	.48**	.48**	—								.78
6. Nonviolent offenses	.07	.29*	.48**	.45**	.63**	—							.83
7. Reactive aggression (T2)	.10	.38**	.56**	.39*	.46**	.32*	—						.84
8. Instrumental aggression (T2)	.20	.36*	.36*	.41**	.29*	.11	.55**	—					.86
9. Violent offenses (T2)	.08	.33*	.37**	.29*	.55**	.31*	.59**	.39**	—				.85
10. Nonviolent offenses (T2)	.01	.32*	.28*	.32*	.50**	.49**	.51**	.32*	.68**	—			.78
11. Official violent offenses (T2)	.05	.19	.17	.22*	.20*	.16	.28*	.24*	.29*	.24*	—		.59
12. Official nonviolent offenses (T2)	.04	.16	.14	.11	.25*	.37**	.38**	.24*	.43**	.46**	.29**	—	.63

Note. T2 = Time 2.
*p < .01. **p < .001.

Nested chi-square difference tests were conducted to examine whether the effects of affect dysregulation and deficient affect varied across reactive and instrumental aggression or across violent and nonviolent offenses. Results revealed a nonsignificant loss in fit when the effects of affect dysregulation and deficient affect were constrained to be equal for each type of aggression (Paths a/b and c/d in Figure 1), $\Delta\chi^2(2) = .13$, p = .94.3 Similarly, there was a

nonsignificant loss in fit when the effects of affect dysregulation were constrained to be equal across reactive and instrumental aggression, and the effects of deficient affect were constrained to be equal across aggression types (Paths a/c and b/d in Figure 1), $\Delta\chi^2$ (2) = .28, p = .87. By contrast, deficient affect showed a stronger relation to both violent and nonviolent offenses as compared to affect dysregulation, as evidenced by a significant loss in fit when these relations were constrained to be equal (Paths a/b and c/d in Figure 2), $\Delta\chi^2$ (2) = 7.90, $p < .05$. Affect dysregulation related comparably to violent and nonviolent offenses, as did deficient affect (Paths a/c and b/d in Figure 2), $\Delta\chi^2$ (2) = 1.07, p = .58.

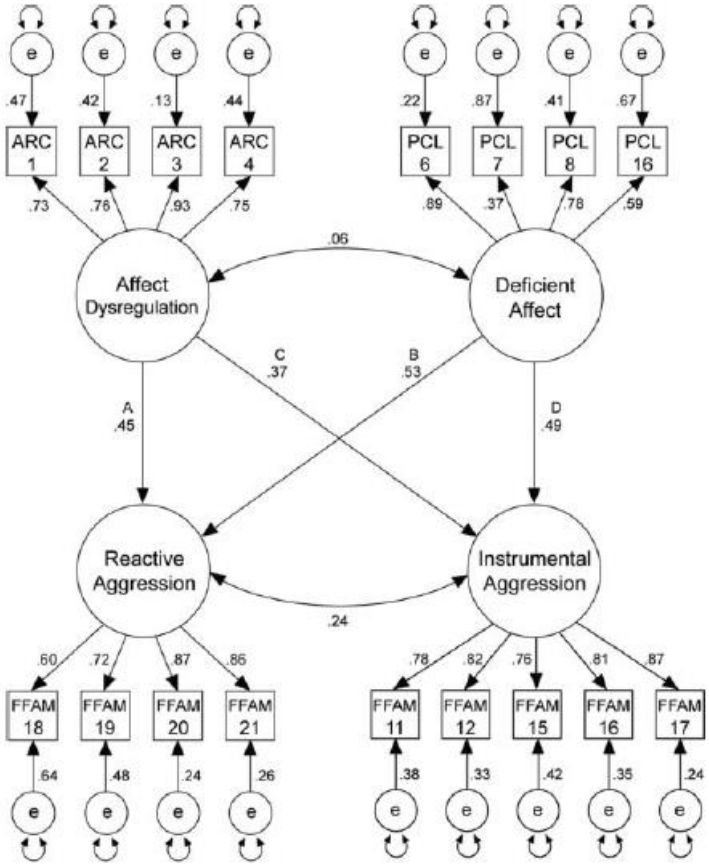

Figure 1: Joint Effects of Affect Dysregulation and Deficient Affect on Reactive and Instrumental Aggression
Note. Time 1; $\chi^2(35, N = 179) = 42.05$, $p = .19$; comparative fit index = .97, Tucker-Lewis index = .99, root mean square error of approximation = .03, weighted root mean square residual = .63. ARC = Affect Regulation Checklist (Moretti, 2003); PCL = Psycopathy Checklist: Youth Version (Forth et al., 2003); FFAM = Form-Function Aggression Measure (Little, et al., 2003).

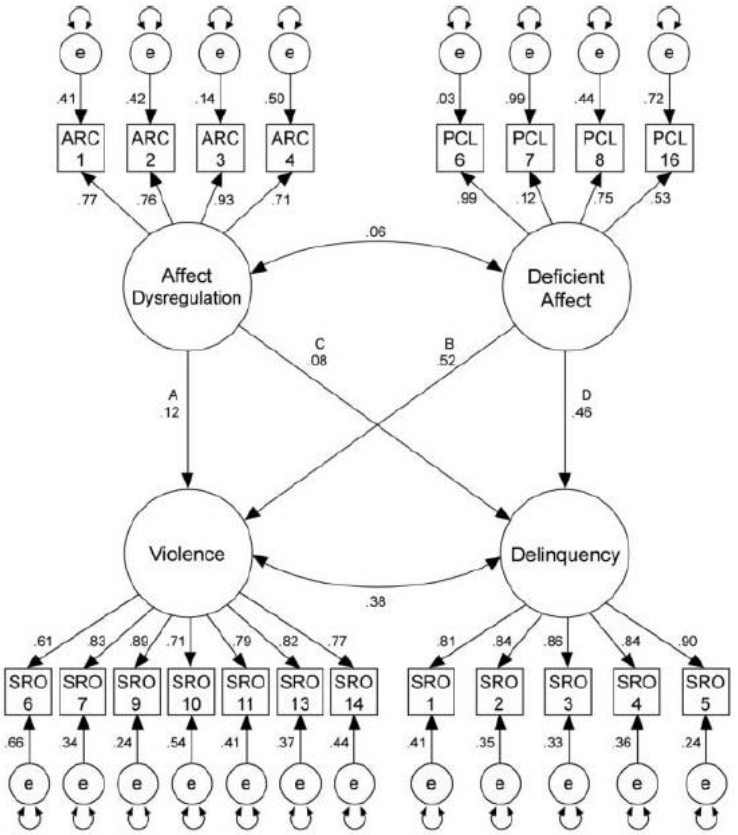

Figure 2: Joint Effects of Affect Dysregulation and Deficient Affect on Violent and Nonviolent Offenses
Note. Time 1; $\chi^2(58, N = 179) = 94.98$, $p < .01$; comparative fit index = .95, Tucker-Lewis index = .96, root mean square error of approximation = .06, weighted root mean square residual = .94. ARC = Affect Regulation Checklist (Moretti, 2003); PCL = Psycopathy Checklist: Youth Version (Forth et al., 2003); SRO = Self-Report of Offending, Revised (Huizinga et al., 1991).

Prospective Relations to Aggressive and Antiosocial Behaviors

The prospective relations of affect dysregulation and deficient affect with aggression, violence, and nonviolent delinquency were tested using outcome measures collected 24 months following the youth's Time 1 participation. The analyses predicting violent and nonviolent offenses (SRO-R, CORNET) controlled for the number of days spent in custody during the follow-up window. The models employing prospective measures of aggression and offending revealed that affect dysregulation was no longer a significant predictor of reactive aggression but remained a significant predictor of instrumental aggression (b = .20, $p < .05$). Thus, with the exception of instrumental aggression, only deficient affect emerged as a significant predictor of

the dependent variables (b = .52, .45, .60, .42, $p < .01$, for reactive aggression, instrumental aggression, violent offenses, and nonviolent offenses, respectively).

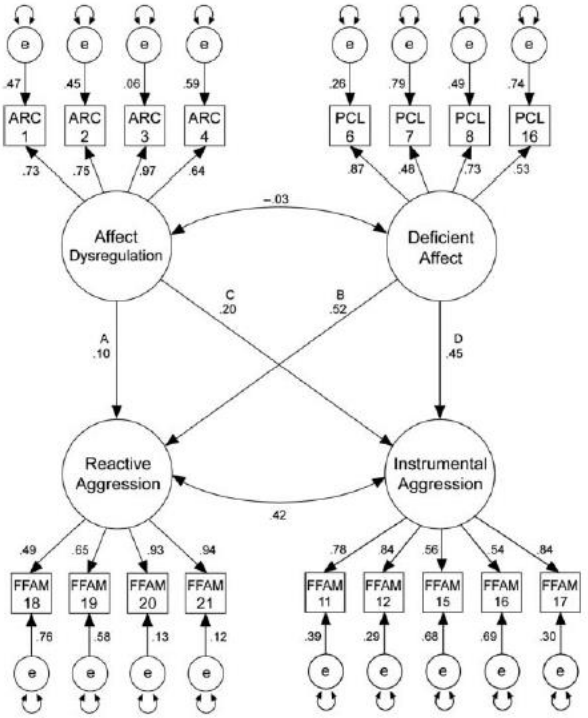

Figure 3: Joint Effects of Affect Dysregulation and Deficient Affect on Reactive and Instrumental Aggression
Note. Time 2; $\chi^2(29, N = 100) = 40.81$, $p = .07$; comparative fit index = .93, Tucker-Lewis index = .95, root mean square error of approximation = .06, weighted root mean square residual = .77. ARC = Affect Regulation Checklist (Moretti, 2003); PCL = Psycopathy Checklist: Youth Version (Forth et al., 2003); FFAM = Form-Function Aggression Measure (Little, et al., 2003).

The overall fit of the model for reactive and instrumental aggression was satisfactory (Figure 3), as was the fit for the model predicting violent and nonviolent offenses (Figure 4).These models accounted for 28% and 24% of the variance in reactive and instrumental aggression and 39% and 23% of the variance in violent and nonviolent offenses. Each of the indicator variables again demonstrated significant loadings onto their respective latent constructs (with the exception of PCL:YV Item 7 for the SRO-R and CORNET models only; l = .21, .14, $p > .05$), suggesting that the measurement portion of the models is reliable. Analogous to the results obtained atTime1, the bivariate association between the dysregulation and deficit factors was minimal and nonsignificant ($r = –.01$ to $–.03$).

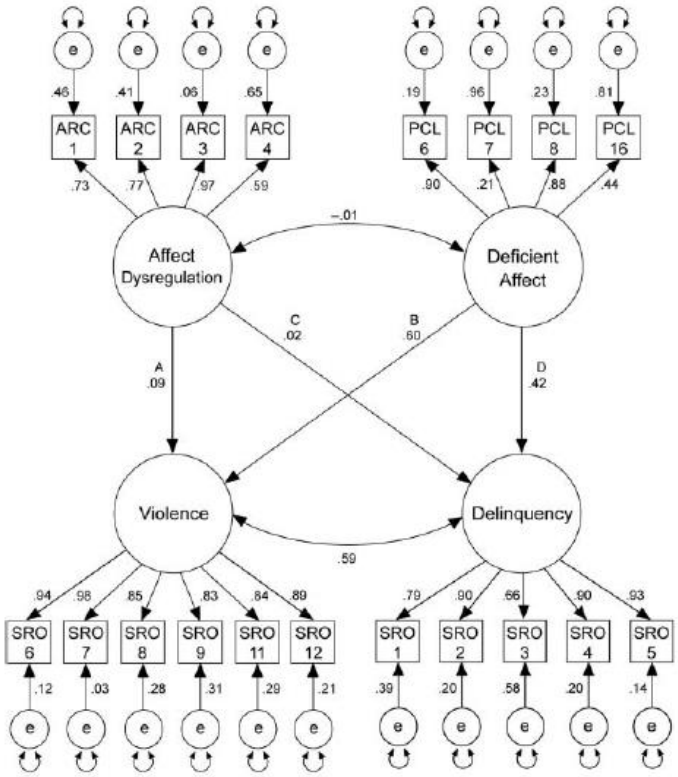

Figure 4: Joint Effects of Affect Dysregulation and Deficient Affect on Violent and Nonviolent Offenses
Note. Time 2; $\chi^2(38, N = 100) = 50.27$, $p = .09$; comparative fit index = .98, Tucker-Lewis index = .98, root mean square error of approximation = .06, weighted root mean square residual = .83. ARC = Affect Regulation Checklist (Moretti, 2003); PCL = Psycopathy Checklist: Youth Version (Forth et al., 2003); SRO = Self-Report of Offending, Revised (Huizinga et al., 1991).

Nested chi-square difference tests were again conducted to examine whether the effects of affect dysregulation and deficient affect vary across prospective reactive and instrumental aggression as well as across violent and nonviolent offenses. In contrast to the results from Time 1, there was a modest loss in fit when the effects of affect dysregulation and deficient were constrained to equal one another for each type of aggression (Paths a/b and c/d in Figure 3), $\Delta\chi^2$ (2) = 5.43, p = .07. This loss in fit stemmed from the fact that deficient affect showed a stronger relationship to both forms of aggression as compared to affect dysregulation. There was a nonsignificant loss in fit when the effects of affect dysregulation were constrained to be equal across reactive and instrumental aggression and when the effects of deficient affect were

constrained to be equal across aggression types (Paths a/c and b/d in Figure 3), $\Delta\chi^2$ (2) = 1.73, p = .42. Similar to the results obtained at Time 1, defi-cient affect showed a stronger relation to both violent and nonviolent offenses as compared to affect dysregulation, as evidenced by a significant loss in fit when these relations were constrained to be equal (Paths a/b and c/d in Figure 4), $\Delta\chi^2$ (2) = 9.60, p < .01. Affect dys-regulation related comparably to violent and nonviolent offenses, whereas deficient affect related more strongly to violent as compared to nonviolent offenses (Paths a/c and b/d in Figure 4), $\Delta\chi^2$ (2) = 7.15, p < .05.

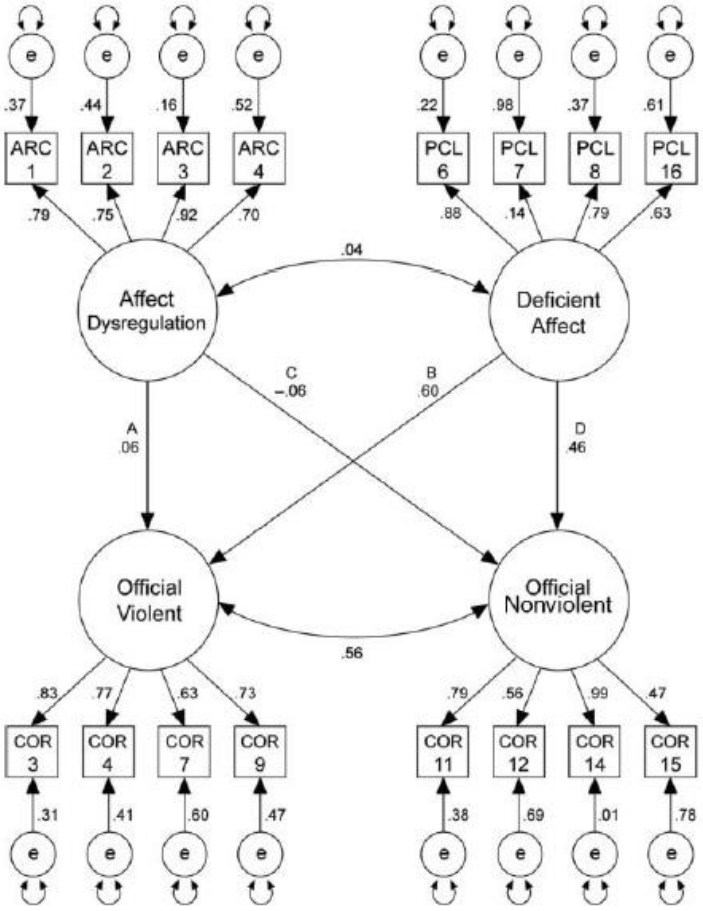

Figure 5: Joint Effects of Affect Dysregulation and Deficient Affect on Violent and Nonviolent Official Recidivism

Note. Time 2; χ^2(36, N = 179) = 45.04, p = .14; comparative fit index = .98, Tucker-Lewis index =.98, root mean square error of approximation = .04, weighted root mean square residual = .80. ARC = Affect Regulation Checklist (Moretti, 2003); PCL = Psycopathy Checklist: Youth Version (Forth et al., 2003).

The prospective relations of affect dysregulation and deficient affect with official

recidivism were tested in an analogous manner. As shown in Figure 5, only deficient affect was a significant predictor of violent and nonviolent recidivism ($\beta = .60$ and .46, $p < .01$, for violent and nonviolent offenses, respectively). The overall fit of the model was satisfactory and accounted for 36% and 21% of the variance in violent and nonviolent offenses, respectively. The bivariate association between the dysregulation and deficit factors was again minimal ($r = .04$). Consistent with these results, nested chi-square difference tests revealed that deficient affect showed a significantly stronger relation to both violent and nonviolent recidivism as compared to affect dysregulation, as evidenced by a significant loss in fit when these relations were constrained to be equal (Paths a/b and c/d in Figure 2), $\Delta\chi^2(2) = 15.60$, $p < .01$. Results also showed that affect dysregulation relates comparably to official violent and nonviolent offenses, as does deficient affect (Paths a/c and b/d in Figure 2), $\Delta\chi^2(2) = 2.75$, $p = .25$.

Discussion

Affect dysregulation and deficient affect have both been linked with aggression and antisocial behavior in youth; however, prior research has not systematically compared the relative or combined predictive utility of these constructs. The present study represents an important step forward in this regard, as it assessed the predictive effects of affect dysregulation and deficient affect simultaneously to investigate whether these constructs are distinct risk factors for aggressive and antisocial behaviors.

Results confirmed that affect dysregulation was significantly related to concurrent and prospective instrumental aggression as well as concurrent reactive aggression. Features of deficient affect were associated with concurrent and future indices of both forms of aggression as well as with violent and nonviolent offenses. As predicted, affect dysregulation and deficient affect shared little common variance despite the fact that they each showed independent

associations with aggression. This important finding highlights the heterogeneity of variables that are involved in adolescent aggression and supports the importance of both affect dysregulation and deficient affect in this type of behavior. Results also point to the significance of features such as callousness, deficient empathy, and remorse in predicting aggression over time and in relation to serious violent and nonviolent offending. This is consistent with the literature suggesting that impairments in empathy are related to aggression among adolescents (Lovett & Sheffield, 2007) and is also in line with the psychopathy literature demonstrating that psychopathic traits (both at the adult and youth level) are associated with violent and nonviolent criminality (Gretton, Hare, & Catchpole, 2004; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002; Penney & Moretti ,2007; Salekin, Rogers, & Sewell, 1996).

Contrary to predictions, affect dysregulation and deficient affect were not differentially related to reactive versus instrumental aggression. Instrumental aggression is generally viewed as a methodical and goal-directed type of aggression (Dodge & Coie, 1987; Little et al., 2003), whereas reactive aggression is characterized by a high degree of sympathetic arousal and reactivity and is typically seen in response to threat or provocation (Berkowitz, 1993; Dodge & Coie, 1987). Our failure to detect specificity in the relation of affect dysregulation and deficient affect to these two forms of aggression may be attributable to the high correlation between them in this sample (r = .59 at Time 1 and r = .54 at Time 2), similar to what has been found in other samples of at-risk youth (e.g., Bushman &Anderson, 2001; Dodge, 2007). Although the reactive-instrumental dichotomy may be of theoretical importance, the lack of evidence toward divergent validity runs counter to the notion of "pure" aggression subtypes that carry with them unique correlates and developmental outcomes (e.g., Little et al., 2003). Further longitudinal research is required to resolve this debate.

It is also important to note that affect dyscontrol was no longer a significant predictor of reactive aggression at Time 2 and was only weakly associated with instrumental aggression. In contrast to deficient affect, which is typically conceptualized as a stable personality trait (Blackburn, 1998; Cleckley, 1976), affect dyscontrol may be less stable and consequently may show less consistent relationships to aggression and antisocial behavior over time. It is also possible that affect dyscontrol diminishes during adolescent development, even for youth at higher risk for emotional and behavioral problems. In contrast, it is unlikely that problems of deficient affect follow a similar developmental course. Research documenting normative and atypical developmental shifts in affective experiences and affect regulation is required to better understand the relationships between these two aspects of development and their unique relationships to behavioral problems.

Implications for Research on the Etiology and Treatment of Aggressive Youth

What are the implications of our finding that two conceptually distinct and statistically uncorrelated problems in affect regulation simultaneously relate to diverse forms of aggression? One possibility is that each of these problems characterizes different subgroups of aggressive youth. Further research utilizing person-based analyses (e.g., latent class analysis) would be informative to investigate, for example, whether there exist distinct subgroups of youth, with one characterized by affect dysregulation and the other by features of deficient affect. The constructs of affect dysregulation and deficient affect may also not be as incompatible as they appear. In fact, Eisenberg and colleagues (1996, 1998) argue that youth who experience affect as aversive and destabilizing may gradually deactivate their level of arousal and appear more affectively deficient over time. These youth may also be rated as more high and stable in their level of psychopathy, reflecting the presence of the regulatory process that shapes their

development toward the prototype of the adult disorder. Thus, rather than reflecting separate problems in regulation, for some youth, affect dysregulation and deficient affect may lie along a developmental continuum. Longitudinal research is required to investigate whether there exist different manifestations of affect dysregulation across development.

Our findings also have implications for the assessment of aggressive and violent youth as well as for prevention and risk reduction. First, these results suggest that if clinicians focus only on problems of affect dysregulation or deficient affect, they may miss important domains of pathology that play a role in sustaining problem behavior. Thus, the assessment of both types of affect regulation problems is advisable. Similarly, preventive and risk reduction measures need to address both affect dysregulation and deficient affect in a manner that is tailored to individual youth. Interventions focused on strengthening effective regulation skills, tolerating affective arousal, and modulating empathic arousal (e.g., Izard, 2002) may be valuable for youth with problems of affect dysregulation; in contrast, behavioral reinforcement paradigms and social skills training may be effective in fostering prosocial behaviors in youth manifesting psychopathic features, such as impaired empathy. Alternately, deficits in emotion knowledge and competence may underlie both affect dysregulation and deficient affect, and therefore specific interventions targeting these deficits (e.g., emotion-based prevention programs; Izard et al., 2008) may have relevance for both types of affective presentations.

Limitations and Directions for Future Research

Although our findings are consistent with prior research in a number of domains and raise important questions for future research, several limitations must be noted. First, the measure of affect regulation used in this study, although based on other validated measures and possessing good psychometric properties, is new and requires further independent evaluation. It

has been observed that measures of affect regulation designed specifically for use with adolescents are scarce (e.g., Phillips & Power, 2007); therefore, the ARC may hold promise as a new tool for use with young persons if it can accumulate further research in support of its use. Many prior studies have employed observer-rating paradigms for measuring affect regulation in young children. Arguably, a self-report format is better suited to assess affect regulation skills beyond childhood in light of adolescents' greater capacity to report on their internal experiences and the idea that regulation becomes an increasingly internal process not readily observable to others (Phillips & Power, 2007). This idea runs counter to the assumption that affect regulation skills in children can be tapped by the use of behaviorally based indicators, such as attention shifting and anger expression (e.g., Cole, Zahn-Waxler, & Smith, 1994; Eisenberg et al., 2001).

A second limitation of this study concerns the reliance on the PCL:YV as the sole indicator of deficient affect. Although the PCL instruments are often considered to be the gold standard with respect to the assessment of psychopathy, employing multiple measures across different methods (e.g., self-report, psychophysiological measures) would provide a more rigorous assessment of deficient affect and reduce the possible contamination of affective problems with behavioral consequences. One concern with the PCL:YV is that overt behaviors (e.g., victim treatment, past violence) may be used in coding items on the affective facet, rendering the relation between deficient affect and behavioral outcomes inflated because of criterion-predictor contamination. The raters in the current study took care to avoid this potential confound by omitting (i.e., not scoring) items on the interpersonal or affective facets of the PCL:YV when only purely behavioral indicators were available.

Although the current study supports the role of affect dysregulation and deficient affect in aggressive behavior, further research is required to illuminate the mechanisms through which

these constructs may result in maladaptive behaviors. Given the conceptual proximity between emotional and behavioral regulation, for example, youth with deficits in affect regulation may act aggressively only in the context of significant behavioral impulsivity as suggested by Whiteside and Lynam (2001). A similar situation may arise for youth manifesting features of deficient affect.

Another important venue for future research is the investigation of gender differences in the predictive ability of affect dysregulation and deficient affect in relation to aggression and antisociality. Although multiple-group invariance testing could not be completed in the current study because of sample size and associated power issues, supplementary regression analyses revealed no gender differences in the predictive ability of affect dysregulation and deficient affect in relation to outcomes. In all cases, the magnitude and direction of the relations were comparable for boys and girls. Future research should assess gender differences both at the construct level (e.g., whether key risk factors, such as deficient affect, are measured equivalently across males and females) and at the level of predictive relations in a systematic manner.

Despite the noted limitations, the current study is one of the first to compare the roles of affect dysregulation and deficient affect simultaneously in predicting aggression, violence, and non-violent delinquency. We tested these relations in a sample of high-risk adolescents, bringing attention to the differing views regarding the role of emotion in aggressive and antisocial behavior. This study also offers a higher degree of specificity in outcomes by examining diverse types of aggression and measuring recidivism via both self-report and official records. A significant challenge for future researchers will be to construct developmentally sensitive models that not only demonstrate the predictive utility of key risk

factors but that account for the interaction of risk factors over time. Also needed are explicit attempts to address issues of etiology in the conceptualization and measurement of risk factors for violence, such as deficient affect and empathy. Longitudinal models are needed to systematically investigate the sequential effects of diverse forms of affect dysregulation, alongside other pertinent risk factors, as they affect the development of problematic personality traits, such as those present in psychopathy (Farrington, 2006). Importantly, this type of research can shed light on questions surrounding the etiology of various emotional and behavioral disorders in children and adolescents and make meaningful contributions toward causal models of aggression and delinquency.

NOTES

1. All raters underwent Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) training in a 1-day workshop, including an overview of psychopathic traits in adolescents, a description of the PCL:YV items, and guidelines on scoring the items. Prior to the start of data collection, between five and eight training assessments were conducted, and a minimum interrater reliability of .85 for the total score was attained.

2. In contrast to maximum-likelihood estimation, which assumes the observed variables are continuous and normally distributed, weighted least squares (WLS) estimation is more appropriate when the data are binary or discrete (e.g., Likert-type items) because of its usage of polychoric correlations (Muthén, du Toit, & Spisic, 1997). Under the robust WLS estimation method in Mplus, missing data are handled using a pairwise present method.

3. The WLSMV estimator in Mplus adjusts the chi-square and degrees of freedom to obtain accurate p values when using categorical variables. The difference in model fit for nested models is based on the derivatives difference test and does not correspond directly with the differences in estimated chi-square and degrees of freedom between the constrained and unconstrained models. As the degrees of freedom are mean and variance adjusted, they do not correspond in a straightforward way with the numbers of measured variables and estimated parameters.

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