Structural Validity of the MACI Psychopathy and Narcissism Scales: Evidence of Multidimensionality and Implications for Use in Research and Screening

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This study investigated the psychometric properties and predictive validity of three self-report scales (the Psychopathy Content Scale, the Psychopathy-16 scale, and the Egotistic scale) derived from the Millon Adolescent Clinical Inventory (MACI) to screen for the presence of psychopathic and narcissistic personality characteristics. Exploratory and confirmatory factor analyses were performed in a sample of 173 clinic-referred adolescents (ages 12–17), results from which suggested that these scales are multidimensional in nature. The Psychopathy Content Scale was best captured by a two-factor structure, with personality-based items loading on one factor and antisocial/impulsive behaviors loading on the second. The most parsimonious solution for the Psychopathy-16 scale was a three-factor model, characterized by callous and egocentric features on the first two factors and antisocial behaviors on the third. The Egotistic scale of the MACI was best represented by three factors, depicting features of self-confidence, exhibitionistic tendencies, and social conceit, respectively. Regression analyses supported the multidimensionality of these scales by showing divergent patterns of association with violent and nonviolent outcomes among the factors that composed the scales.

Currently there exist a number of validated assessment instruments that have utility for predicting or postdicting violence and aggression among adolescents. Instruments assessing psychopathic personality features, for instance, have received considerable empirical attention over the past decade and appear modestly to robustly correlated with current and future violence among samples of male adolescents (Forth, Kosson, & Hare, 2003; Gretton, Hare, & Catchpole, 2004; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002). Similarly, measures of narcissism have also been associated with indexes of conduct problems and aggressive behavior in samples of children and adolescents (Barry, Frick, & Killian, 2003; Washburn, McMahon, King, Reinecke, & Silver, 2004). Despite important theoretical and clinical differences between psychopathy and narcissism, they share several features. In particular, narcissism and psychopathy share several interpersonal and affective characteristics (e.g., grandiosity, interpersonal exploitativeness, a lack of remorse or empathy) that are believed to be central for predicting aggression and violence (Blackburn, 1998).

Growing interest in psychopathy and narcissism as risk factors for aggression has spurred the development of brief, self-report measures to tap features of these two personality constructs. Although the use of such instruments among researchers and clinicians has been increasing, the psychometric validity of these measures has yet to be firmly established. This is particularly troublesome if these instruments are multidimensional and contain a number of factors that differentially relate to aggression and violence (Reise, 1999). Our study examined the structural validity of three scales based on the Millon Adolescent Clinical Inventory (MACI; Millon, 1993) designed to assess features of psychopathic and narcissistic personality in adolescents.

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Juvenile Psychopathy

In the past decade, research on the identification of psychopathic features in youth has proliferated. An important question is whether the construct of psychopathy is associated with similar outcomes in youth as has been found in samples of incarcerated adults (e.g., persistent and chronic violent offending; Harris, Rice, & Cormier, 1991; Salekin, Rogers, & Sewell, 1996). To date, the literature linking psychopathic features to concurrent and future violence among male juveniles has been largely consistent with the adult offender literature (Corrado, Vincent, Hart, & Cohen, 2004; Kosson et al., 2002; Marshall, Egan, English, & Jones, 2006). As interest in youth psychopathy has grown, researchers have begun to construct various self-report measures that represent key features of psychopathy as exemplified in the Psychopathy Checklist, Youth Version (PCL:YV; Forth et al., 2003). The use of self-report instruments to assess psychopathic traits has been supported in research on adult samples (Lilienfeld & Andrews, 1996; Poythress, Edens, & Lilienfeld, 1998), and there is a growing body of research on the use of similar instruments as screening devices in adolescents (see Vaughn & Howard, 2005, for a review).

One such self-report instrument, the Psychopathy Content Scale (PCS; Murrie & Cornell, 2000), is a 20-item measure developed from the MACI. A number of recent studies have investigated the measure's concurrent and predictive validity with encouraging results. The PCS was shown to correlate significantly with the total score of the PCL:YV (r ranging .49–.60; Murrie & Cornell, 2002; Murrie, Cornell, Kaplan, McConville, & Levy-Elkon, 2004), and was associated with concurrent reports of instrumental aggression ($\beta = .44$, $p < .001$) and empathy and remorse ($\beta = -.41$, $p < .001$) in a sample of male and female incarcerated youth (Loper, Hoffschmidt, & Ash, 2001). In an all-male incarcerated sample, Murrie et al. (2004) found significant associations between the PCS and historical indexes (gathered from a file review) of unadjudicated violence ($r = .24$, $p < .01$), institutional violence ($r = .29$, $p < .01$), and acts of assault with a weapon ($r = .26$, $p < .01$). In a large male forensic sample ($N = 481$), Lexcen, Vincent, and Grisso (2004) found significant concurrent associations between the PCS and the Delinquent and Aggressive Behavior subscales of the Child Behavior Checklist–Youth Self-Report (r ranging .49–.66) as well as with the Alcohol/Drug Use and Angry/Irritable subscales of the Massachusetts Youth Screening Instrument-Second Version (r ranging .34–.64). Finally, a study by Salekin and colleagues (Salekin, Ziegler, Larrea, Anthony, & Bennett, 2003) offered limited support of the predictive validity of the PCS, demonstrating a positive association between the Antisociality factor of the PCS and measures of violent ($r = .35$, $p < .05$) and general ($r = .44$, $p < .01$) recidivism (2-year follow-up) in a sample of male and female adjudicated youth.

The dimensionality of psychopathy has been an issue of some debate in the field. Several confirmatory factor analyses have questioned the psychometric soundness of the traditional two-factor structure of the PCL-Revised (PCL-R) in adult samples (i.e., with Factor 1 representing the interpersonal and affective features of psychopathy, and Factor 2 encompassing the antisocial and impulsive behaviors), as well as with youth (Kosson et al., 2002; Odgers, Reppucci, & Moretti, 2005). It has been suggested that a shorter three-factor solution that separates the items into interpersonal (e.g., grandiosity, manipulativeness), affective (e.g., callousness), and behavioral (e.g., impulsivity, stimulation seeking) features represents a more parsimonious and theoretically consistent model of psychopathy (Cooke & Michie, 2001). In light of these findings, Salekin and colleagues (2003) outlined a second psychopathy scale (P-16) comprised of 16 MACI items, which was designed to align more closely with Cooke and Michie's three-factor solution. Although the PCS and P-16 share eight items, the P-16 omits most items on the PCS concerned with substance use and adds in additional items to assess callous and egocentric personality features. Salekin and colleagues found the total score on the P-16 to be more strongly associated with indicators of violent recidivism than the PCS ($r = .61$ and .20 for the P-16 and PCS scales, respectively) and emphasized the importance of considering egocentric and callous traits in the assessment of psychopathy and prediction of youth violence.

An important limitation in this body of literature is the fact that, to date, only one study (Lexcen et al., 2004) has investigated the factor structure of the PCS and no studies have assessed the structural properties of the P-16. The original studies on the PCS by Murrie and colleagues (Murrie & Cornell, 2000, 2002; Murrie et al., 2004) assumed a unidimensional model for the PCS by utilizing a summed total score for the 20 items. In contrast, Lexcen and colleagues conducted principal components and confirmatory factor analyses and found that the PCS was best represented by a two-factor solution (accounting for 33% of the variance), which resembled the original factor structure of the PCL-R (Hare, 1991). However, the factor model obtained by these researchers revealed an inconsistent pattern of item loadings, suggesting poorly defined or unreliable factors (e.g., a mixture of positive, negative, and nonsignificant loadings for all negatively valenced items). A review of the literature thus quickly reveals that the factor structures of both the PCS and P-16 are largely unknown.

Juvenile Narcissism

Narcissism has been defined in a variety of ways, from Kohut's (1977) early description of narcissistic ego defense to the *Diagnostic and Statistical Manual of Mental Disorder*'s (4th ed. [*DSM-IV*'s]; American Psychiatric Association, 1994) definition of Narcissistic Personality Disorder (American Psychiatric Association, 1994). Despite the different definitions of adult narcissism that have been described in the literature (e.g., overt and covert narcissism; Dickinson & Pincus, 2003), there are several similarities in their core features. Most notably, individuals high on narcissism tend to hold an exaggerated sense of self-importance as well as an unrealistic sense of entitlement. Individuals high on narcissism also often show impaired empathy for others and can be interpersonally exploitative in meeting their needs (Ronningstam, 2005). Furthermore, the fragility of the narcissist's sense of self as well as the hostility that ensues in response to threat are defining features of narcissism that cut across different subtypes (Dickinson & Pincus, 2003).

In contrast to the growing literature on psychopathic features in adolescents, research on the relation of narcissism and aggression in youth is still in its infancy. The few available studies suggest that narcissism is positively correlated with conduct problems and aggression in children (Barry et al., 2003) and adolescents (Costello & Dunaway, 2003; Salmivalli, Kaukiainen, Kaistaniemi & Laerspetz, 1999; Washburn et al., 2004). For example, among school-age children, Barry and colleagues (2003) found an association between narcissism and features of conduct disorder and oppositional defiant disorder that was moderated by the child's level of self-esteem, such that children with high levels of narcissism and low self-esteem showed the highest rates of conduct problems. In a related study, Washburn et al. (2004) examined the association between narcissism, self-esteem, and aggression in a sample of inner-city youth (ages 10–15 years) and found that narcissistic exploitativeness (defined by overconfidence in one's abilities and a willingness to manipulate others) predicted proactive aggression.

Although this small body of literature suggests a relationship between narcissism and aggression, there are two important limitations: Studies have used different instruments to assess narcissistic features in adolescents, some of which may contain age-inappropriate items (e.g., the Narcissistic Personality Inventory [NPI]; Raskin & Hall, 1979), and the structural properties of narcissism in youth are poorly defined, thereby limiting the specificity of conclusions that researchers can reach regarding the concurrent or predictive validity of the construct. Related to the second point, although authors acknowledge that narcissism is not unidimensional, it remains unclear how many facets compose the construct and how these dimensions relate to violence and aggression in adolescents. Of importance, it has been suggested that not all components of narcissism are inherently maladaptive or predictive of aggression; rather, certain features of the construct may work to facilitate positive outcomes such as autonomy, individuation, and self-reliance in adolescents as they navigate their transition into adulthood (Stolorow, 1986). Empirical findings have generally supported this claim, showing that only the maladaptive features of narcissism (e.g., entitlement, exploitativeness) are associated with aggression and conduct problems, whereas those features considered to be more adaptive (e.g., authority, self-sufficiency) are unrelated to these types of outcomes (Barry et al., 2003; Washburn et al., 2004).

THE CURRENT STUDY

A review of the literature shows that psychopathic features and narcissism are associated with conduct problems and aggression in adolescents. However, in the absence of research examining the structural composition of the scales used to measure these constructs, our interpretation of these findings should be cautious. The principal goal of our study is to examine the dimensionality and predictive validity of three MACI scales designed to assess psychopathic and narcissistic features in adolescents. This represents a necessary step toward understanding the structure of psychopathy and narcissism in youth and how the dimensions of these constructs are related to relevant outcomes (e.g., violence, delinquency).

METHOD

Participants

Participants were 173 adolescents (100 male, 73 female) between the ages of 12 and 17 years ($M = 14.49$, $SD = 1.73$) who were referred to a provincial assessment and treatment planning center for serious behaviorally disordered youth in British Columbia, Canada. Although youth present with primary problems of aggression and antisocial behavior, they frequently show other concurrent mental health problems such as attention deficit hyperactivity disorder, depression, and anxiety. The clinical profile of youth in this facility is consistent with high rates of comorbid social and emotional problems commonly found in youth with serious behavior problems (Teplin, Abram, McClelland, Dulcan, & Mericle, 2002). The majority of the sample (69%) identified themselves as Caucasian, whereas the

remainder of the sample identified themselves as either Aboriginal (14%), Asian (6%), African (3%), or of other ethnicity (8%).

Procedure

As part of the intake assessment at this facility, all youth are administered a battery of paper-and-pencil self-report questionnaires, which include the MACI and the Child Behavior Checklist-Youth Self-Report (YSR; Achenbach, 1991). MACI and YSR data were extracted for 173 consecutive admissions to this facility between January 2002 and March 2004. A subset of these youth ($n = 93$) were also administered the Self-Report of Delinquency (SRD) as part of their participation in a separate research project. During the period in which this project was completed, 93 of 103 admissions participated. Reasons for exclusion from the study included refusal to participate ($n = 7$), severe intellectual deficits ($n = 2$), and diagnostic exclusions (presence of thought disorder; $n = 1$).

All measures (i.e., MACI, YSR, and SRD) were completed within the first 2 weeks of the youth's admission to the facility on an individual basis and with the assistance of trained staff. Data from these measures were collected with the informed consent of the legal guardian (i.e., parent or designated person) and assent of the youth. Youth 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) for the purposes of the research study. Ethical approval was granted for this project under the university ethics review board as well as from the research committee at the assessment and treatment planning facility.

Measures

Egotistic Personality Scale of the MACI. The MACI is a widely used self-report personality inventory designed to correspond with *DSM* nosology for both Axis I and II disorders. It is comprised of 160 *yes/no* items that provide scores on 31 scales describing personality characteristics, clinical syndromes, and personal problems. The Egotistic Personality subscale is composed of 39 items that bear conceptual similarity to the six components of narcissistic personality in the *DSM-IV*: admirable self-image, social conceit, confident purposefulness, self-assured independence, empathic indifference, and superiority feelings (McCann, 1997). Data from the MACI development sample ($N = 579$) indicate adequate levels of internal consistency (alpha coefficient = .80) and test-retest reliability (over 3–7 days = .82) for the Egotistic scale. Studies employing a cluster analytic approach have found that subgroups characterized by externalizing behavior

problems score higher on the Egotistic scale compared to clusters defined by depressive and internalizing symptoms (Stefurak & Calhoun, 2007; Taylor, Kemper, Loney, & Kistner, 2006).

Psychopathy Content Scale of the MACI. The PCS was developed by selecting 25 MACI items that were conceptually related to psychopathy and then removing 5 items that decreased the internal consistency of the scale. The result was a 20-item, single factor scale with high internal consistency (alpha coefficient = .87) and which correlated .60 with an early adolescent version of the PCL-R. A recent study (Lexcen et al., 2004) suggested that the PCS may be best conceptualized as having two factors that correspond to the dimensions underlying the PCL-R (i.e., interpersonal/affective personality characteristics and antisocial behaviors).

Psychopathy-16 Scale of the MACI. The P-16 was developed by selecting 25 MACI items that conceptually mapped onto the PCL-R and removing 9 items that decreased the internal consistency of the scale. Items were chosen as to align the scale with a refined conceptualization of psychopathy, one that delineates the interpersonal and affective features of the construct more explicitly (Cooke & Michie, 2001). The result was a 16-item scale that had an internal consistency (alpha coefficient) of .86 and correlated .39 and .61 with rates of general and violent recidivism, respectively.

Child Behavior Checklist–YSR. The YSR is an extensively validated, self-report measure consisting of 112 items that youth can endorse as not true, sometimes true, or very true for themselves. This study investigated the Aggressive and Delinquent Behavior scales of the YSR. Items appearing on the Aggressive Behavior scale include both general conduct problems (e.g., arguing, stubbornness, disobedience), as well as overt physical aggression. In contrast, the Delinquent Behavior subscale includes items assessing nonviolent antisocial behaviors (e.g., lying, stealing, vandalism). For our study, a *T*-score of 65 was used to dichotomize scores that fell above and below a clinically significant threshold (Achenbach, 1991). Data from the manual indicate satisfactory levels of reliability for both the Aggressive (alpha coefficient = .86) and Delinquent Behavior (alpha coefficient = .76) scales. Elevated scores on the these scales have also been positively associated with *DSM-IV* diagnoses of attention deficit hyperactivity disorder, conduct disorder, and oppositional defiant disorder (Rey, Sawyer, & Prior, 2005) and show discriminant utility in terms of predicting the overt (Aggressive Behavior scale) versus covert (Delinquent

Behavior scale) behaviors associated with conduct disorder (Tackett, Krueger, Sawyer, & Graetz, 2003).

Self Report of Delinquency (SRD; Elliott & Ageton, 1980). The SRD is a widely studied self-report measure of offending in adolescents. It includes 36 items that span across both violent and nonviolent behaviors. The SRD has been shown to produce results concordant with official measures of delinquency (Elliott, Dunford, & Huizinga, 1987) and to demonstrate functional invariance across gender and ethnicity (Knight, Little, Losoya & Mulvey, 2004). Consistent with past uses of the SRD (e.g., Huizinga & Elliott, 1986), five subscales were examined (i.e., minor and major assault, minor and major theft, and vandalism), which utilize 16 SRD items and which are consistent with Elliott and Ageton's (1980) original subscales encompassing crimes against persons and property. Examination of the distribution of scores on these subscales suggested a bimodal distribution; thus, to avoid distortion of findings due to the few cases that reported high-frequency engagement, a dichotomous variable was created to reflect whether a youth had *ever* engaged in these offenses in the last year.

RESULTS

Of the total sample, 66% of boys and 74% of girls fell above the clinical cutoff (i.e., a *T*-score of 65 or higher) for delinquent behavior as measured by the YSR. A somewhat smaller percentage of youth (44% of boys, 48% of girls) fell above the cutoff for aggressive behavior on the YSR. On the SRD, 43% of boys and 60% of girls reported engaging in at least one act of serious assault, whereas the corresponding figures for major theft and vandalism were 60 and 57% of boys, and 66 and 63% of girls, respectively.

PCS

The first set of analyses examined the dimensionality of the PCS via exploratory factor analysis (EFA). Principal components analysis with direct oblimin (oblique) rotation was conducted using SPSS v. 14.0. Allowing the number of factors to remain unconstrained, five components were extracted that had eigenvalues greater than the mean.[1] The first component accounted for 29% of the variance, whereas the remaining four components accounted for 10, 8, 6, and 6% of the variance, respec-

tively. A closer examination of the five-factor solution revealed that the third, fourth, and fifth factors comprised few items ($n = 2$, 1, and 3, respectively) and items that cross-loaded on other factors. In addition, the convergence of item loadings was not consistent with conceptual models. In light of these findings, the analysis was rerun constraining the number of components extracted to two. Results from this analysis produced two interpretable and theoretically meaningful factors that accounted for 39% of the variance (29% and 10%, respectively) and had approximately equal numbers of items loading on each factor. Loadings ranged from $-.18$ to .76 for the first factor and from .42 to .87 for the second factor (all but two items evidenced loadings $> .30$; only one item cross-loaded on both factors).

Confirmatory analyses were performed using Mplus version 3.1 (Muthén & Muthén, 2004) because of the program's ability to handle dichotomous data. Robust weighted least-squares estimation was used with a mean- and variance-adjusted chi-square algorithm.[2] According to Hu and Bentler's (1999) criteria for acceptable model fit (i.e., comparative fit index [CFI] equal or greater than .95 and root mean square error of approximation [RMSEA] of .06 or lower), constraining all 20 items on the PCS to load onto one latent factor resulted in a poor fit (CFI = .89, RMSEA = .11). The two-factor model proposed from the exploratory analyses evidenced a better fit to the data (CFI = .94, RMSEA = .08). When several items with poor threshold parameters were eliminated (resulting in a 13-item scale), the fit improved still (CFI = .97, RMSEA = .05). Chi-square difference tests revealed a significant *loss* of fit when moving from the two- to one-factor model, $\Delta\chi^2(1) = 28.53$, $p < .001$, supporting the relative superiority of the two-factor model. Further, the two-factor model demonstrated a satisfactory fit in both male (CFI = .97, RMSEA = .06) and female (CFI = .98, RMSEA = .04) adolescents.

Table 1 contains the CFA standardized item loadings for the final two-factor solution, as well as the EFA loadings for the same items. Factor 1 (callous/manipulative) included items reflecting a domineering and manipulative style, as well as a disregard for personal responsibilities and the feelings of others. Factor 2 (substance use/impulsivity) comprised items reflecting a maladaptive pattern of substance use as well as indicators of impulsive antisocial behavior. With the exception of MACI Item 42 (falls short of own expectations), all item loadings were significant as evaluated by a *z* test (i.e., the value of each parameter estimate

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[1]Eigenvalues greater than the mean, in contrast to eigenvalues greater than 1.00, are used to determine retention of factors when analyzing the covariance (as opposed to correlation) matrix in principal components analysis.

[2]In contrast to maximum-likelihood estimation, which assumes the observed variables are continuous and normally distributed, WLS estimation is more appropriate when the data are binary or discrete because of its usage of polychoric correlations (Muthén, du Toit, & Spisic, 1997).

TABLE 1
Confirmatory Factor Analysis Standardized Item Loadings for PCS
Two-Factor Solution

MACI Item[a]	Factor 1	Factor 2
5. Avoids hurting others feelings[b]	.47 (.54)	
9. Tries to engage in correct behavior[b]	.60 (.49)	
28. Frightens others to get what they want	.77 (.39)	
42. Falls short of own expectations	−.14 (−.18)	
52. Uses others to get needs met	.74 (.66)	
117. Fails to consider impact of behavior on others	.74 (.76)	
128. Behaves aggressively or is domineering	.79 (.60)	
135. Acts charming to get things from others	.34 (.27)	
40. Previous intoxication and disorientation		.85 (.82)
62. Enjoys thinking about sex		.48 (.45)
120. Dependant on marijuana		.88 (.87)
150. Enjoys breaking the law		.85 (.57)
152. Intoxication while socializing		.88 (.81)

Note: Corresponding exploratory factor analysis loadings are provided in parentheses. PCS = Psychopathy Content Scale; MACI = Millon Adolescent Clinical Inventory. Model fit indexes: comparative fit index = 0.97, root mean square error of approximation = 0.05. Cronbach's α = .61 (Factor 1), .79 (Factor 2).
[a]Item content was summarized with permission of National Computer Systems, Inc., Minneapolis, Minnesota.
[b]Item was reverse scored.

divided by its estimated standard error was > 1.96). The two latent factors were moderately related ($r = .56$).

P-16

To assess the factor structure of this scale, we first performed an EFA leaving the number of factors to vary. This resulted in the extraction of six factors, only three of which were interpretable and had sufficient items load. Constraining the EFA to extract three factors produced three interpretable factors accounting for 41% of the variance (21%, 11%, and 9%, respectively). Of note, item distributions were similar but not exactly the same as Salekin and colleagues' theoretical conceptualization of the scale. Approximately equal numbers of items loaded on each factor, whereas only two items evidenced cross-loadings. Item loadings ranged from .26 to .63 for the first factor, −.02 to .72 for the second factor, and −.07 to .87 for the third factor (five items evidenced loadings <.30).

When examined via CFA, the three-factor model proposed by Salekin and colleagues (2003) evinced a poor fit to the data (CFI = .76, RMSEA = .09), as did a unidimensional model of the P-16 (CFI = .70, RMSEA = .10). When the interpersonal and affective dimensions of Salekin's three-factor model were combined to form a two-factor model (thus enabling a comparison with the PCS), results were similar (CFI = .76, RMSEA = .09). The three-factor solution that emerged from the exploratory analyses represented an improvement over these models, yet model fit

remained unsatisfactory (CFI = .82, RMSEA = .08). Despite the less-than-optimal levels of fit associated with both of the three-factor solutions and the small differences between fit indexes for these models, results for concurrent validity are presented on Salekin's three-factor model to facilitate comparisons with existing research and consistency with the theoretical development of the scale. Of note, results from chi-square difference testing revealed a significant loss of fit when moving from Salekin's three-factor model to a one-factor model, $\Delta\chi^2(3) = 26.31$, $p < .001$. In addition, the fit statistics for Salekin's three-factor model were comparable across boys (CFI = .77, RMSEA = .10) and girls (CFI = .69, RMSEA = .11).

Standardized item loadings for this CFA model are presented in Table 2, as are the loading for each item from the EFA. Items reflecting a lack of empathy and callousness comprised the first factor of this model (callousness), whereas items reflecting a conceited and manipulative style are on the second factor (egocentricity). Antisocial and law-breaking behaviors are found on the third factor (antisociality). All item loadings were significant ($z > 1.96$) and in the expected direction with the exception of MACI Item 146 (feels superior compared to others) and 155 (pathological lying). The associations among the three latent factors were moderate to large in size: $r_{1,2} = .68$, $r_{1,3} = .52$, and $r_{2,3} = .60$.

Narcissism

The same sequence of analysis was performed using the Egotistic scale of the MACI. An EFA that allowed the number of factors to remain unconstrained extracted 12 components that had eigenvalues greater than the mean and cumulatively accounted for 63% of the variance. However, only three of these factors were interpretable and had sufficient items load. Results from an EFA that was constrained to extract three factors closely resembled previous work done on the factor structure of the NPI: Factor 1 (confident) contained items reflecting a positive self-image and confident independence, Factor 2 (exhibitionism/superiority) was characterized by exhibitionistic tendencies and feelings of superiority compared to others, and Factor 3 (conceit/assuredness) was composed primarily of items reflecting social conceit and an exaggerated view of the future. The three factors in this solution together accounted for 33% of the variance (20%, 7%, and 6%, respectively). The majority of items (33 of 39) evidenced factor loadings greater than .30, although 11 items demonstrated cross-loadings on one or more factors.

Despite the theoretical consistency of the three-factor solution, as well as its resemblance to the structure of the NPI (Kubarych, Deary, & Austin, 2004; Washburn et al., 2004), when a CFA was run on this model the

TABLE 2
Confirmatory Factor Analysis Standardized Item Loadings for P-16 Three-Factor Solution

MACI Item[a]	Factor 1	Factor 2	Factor 3
5. Avoids hurting others feelings[b]	.60 (.63)		
21. Insensitive to punishment	.65 (.54)		
60. Callousness	.50 (.43)		
61. Unconcerned for well-being of others	.56 (.50)		
139. Condescending and hurtful towards others	.73 (.26)		
7. Conceited		.28 (−.02)	
52. Uses others to get needs met		.76 (.23)	
103. Enjoys attention from others		.43 (.62)	
135. Acts charming to get things from others		.44 (.72)	
146. Feels superior compared to others		.24 (.56)	
155. Pathological lying		.29 (.18)	
15. No law violations[b]			.69 (.87)
23. Obedient[b]			.41 (−.07)
45. Juvenile delinquent			.70 (.64)
111. Contact with the legal system			.84 (.82)
150. Enjoys breaking the law			.80 (.62)

Note: Corresponding exploratory factor analysis loadings are provided in parentheses. P-16 = Psychopathy-16 Scale; MACI = Millon Adolescent Clinical Inventory. Model fit indexes: comparative fit index = 0.76, root mean square error of approximation = 0.09. Cronbach's α = .51 (Factor 1), .38 (Factor 2), .67 (Factor 3).

[a]Item content was summarized with permission of National Computer Systems, Inc., Minneapolis, Minnesota.
[b]Item was reverse scored.

result was a less than adequate fit (CFI = .89, RMSEA = .08). Model fit was slightly improved when items with poor threshold parameters were eliminated (CFI = .92, RMSEA = .06), and the fit of this model was superior to that of a unidimensional model containing the same set of items, $\Delta\chi^2(3) = 44.49, p < .001$. This reduced model also represented a more parsimonious solution as compared to the six-factor model suggested in an adjunct to the MACI user's manual (McCann, 1997), and demonstrated a slightly better fit to the data as compared to this model (CFI = .83, RMSEA = .06). In addition, model fit for the three-factor solution was comparable across boys (CFI = .93, RMSEA = .06) and girls (CFI = .90, RMSEA = .07).

Despite the modest fit statistics for the reduced three-factor model, the theoretical significance and interpretability of this model led us to retain it for the purposes of assessing the concurrent validity of the scales in subsequent regression analyses. Standardized item loadings from the CFA for the three-factor model are presented in Table 3 with the factor loading from the EFA. All item loadings were significant ($z > 1.96$) and in the expected direction with the exception of MACI Item 7 (conceited) and 56 (dramatic and showy). The correlations among the latent factors were moderate to large in size ($r_{1,2} = .45, r_{1,3} = .73, r_{2,3} = .58$).

Concurrent Validity Analyses

Zero-order relationships and average effect sizes between each scale and the study's outcome variables are presented in Table 4. Of note, there did not appear to be substantial discrepancies between the results using the refined scales that emerged through our factor analyses and the scales as they were originally conceptualized and used in the literature. In all cases, the direction and magnitude of the correlations with the dependent measures remained the same. The correlations with the total scale score for each measure are also provided for comparison purposes. Findings indicate that both factors on the PCS, callous/manipulative and substance use/impulsivity, were correlated with aggression and delinquency on the YSR. Whereas the substance use/impulsivity factor correlated with vandalism and theft, only the callous/manipulative factor correlated with assault. On the P-16, antisociality (Factor 3) correlated with all dependent measures, whereas callousness and egocentricity (Factors 1 and 2) were associated with delinquent and aggressive behaviors, as well as vandalism (callousness only). The Egotistic scale demonstrated fewer significant relationships to the criterion variables, although conceit/assuredness (Factor 3) was significantly and *inversely* related to the violent outcomes (i.e., aggression, assault) as well as to delinquency and theft. Exhibitionism/superiority (Factor 2), in contrast, was positively related to delinquent behavior only.

To investigate the unique contributions of each factor on the PCS, P-16, and Egotistic scale, a series of binary logistic regression analyses were run for each scale controlling for the shared variance between the factors and dependent variables. This was accomplished by entering all factors of a scale simultaneously in the regression analysis, and performing this for each separate scale (i.e., PCS, P-16, and the Egotistic scale).

TABLE 3
Confirmatory Factor Analysis Standardized Item Loadings for MACI Egotistic Three-Factor Solution

MACI Item[a]	Factor 1	Factor 2	Factor 3
10. Satisfied with own appearance	.93 (.78)		
26. Dissatisfied with own appearance and intellect[b]	.87 (.76)		
31. Thinks others are better looking than self[b]	.62 (.56)		
39. Unconcerned with others' opinions of self	.40 (.38)		
68. Satisfied with body appearance	.83 (.78)		
84. Unhappy with self and personality[b]	.79 (.71)		
99. Thinks is unattractive to others[b]	.76 (.64)		
127. Dissatisfied with being himself or herself[b]	.80 (.65)		
131. Pleased with physical development	.81 (.78)		
140. Disappointed with personality development[b]	.75 (.56)		
7. Conceited		.16 (.04)	
56. Dramatic and showy		.07 (.36)	
59. Flirtatious		.51 (.71)	
86. Thinks is more talented than others		.83 (.50)	
94. Enjoys sex		.44 (.41)	
101. Assured of own abilities		.83 (.35)	
103. Enjoys attention from others		.33 (.62)	
135. Acts charming to get things from others		.55 (.61)	
146. Feels superior compared to others		.36 (.19)	
1. More comfortable following others than leading[b]			.38 (.15)
2. Confident of self and goals			.45 (.48)
34. Feels a lack of direction in life[b]			.50 (.47)
69. Is not socially integrated[b]			.79 (.51)
115. Feels less certain of personality and desires[b]			.67 (.50)
145. Thinks of self as mature and goal-directed			.54 (.37)

Note: Corresponding exploratory factor analysis loadings are provided in parentheses. MACI = Millon Adolescent Clinical Inventory. Model fit indexes: comparative fit index = 0.92, root mean square error of approximation = 0.06. Cronbach's α = .86 (Factor 1), .60 (Factor 2), .60 (Factor 3).
[a] Item content was summarized with permission of National Computer Systems, Inc., Minneapolis, Minnesota.
[b] Item was reverse scored.

With respect to the PCS, results indicated that both factors, callous/manipulative and substance use/impulsivity, were significantly related to delinquent behavior (OR = 1.91, 2.37; Wald = 14.33, 25.37, $p < .01$ for PCS Factor 1 and 2, respectively). In contrast, only callous/manipulative characteristics (Factor 1) were

TABLE 4
Bivariate Relationships Between Factor Scores and Outcome

Assault	YSR Delinquency	SRD Vandalism	SRD Major Theft	YSR Aggression	SRD Major	Average d
PCS 1	.43** (.48**)	.20 (.31*)	.25 (.34**)	.43** (.47**)	.28* (.36**)	0.8
						0.7
PCS 2	.54** (.60**)	.26* (.32*)	.46** (.55**)	.22* (.26**)	.06 (.16)	0.9
Total	.59** (.63**)	.28* (.37**)	.30* (.42**)	.40** (.42**)	.21 (.30*)	0.5
P-16 1	.26*—	.27*—	.19—	.30**—	.22—	0.4
P-16 2	.32**—	−.01—	.22—	.20*—	.14—	1.1
P-16 3	.52**—	.36**—	.52**—	.37**—	.34**—	0.9
Total	.51**—	.28*—	.31*—	.40**—	.32*—	0.3
Egotistic 1	−.18 (−.16)	−.10 (−.08)	−.05 (−.05)	−.15 (−.19)	−.02 (−.04)	0.4
Egotistic 2	.32** (.35**)	−.04 (.03)	.20 (.22)	.18 (.26**)	.12 (.15)	0.5
Egotistic 3	−.23* (−.14)	−.25 (−.18)	−.29* (−.17)	−.25* (−.22*)	−.32* (−.31*)	0.2
Total	−.05 (−.02)	−.15 (−.10)	−.01 (−.01)	−.09 (−.09)	−.06 (−.07)	

Note: Zero-order correlations between the original (i.e., full length) scales and outcome are presented in parentheses; no items were eliminated from the P-16. $N = 173$ for the YSR variables (delinquency and aggression), and $n = 93$ for the SRD variables (vandalism, major theft, and major assault). YSR = Youth Self-Report; SRD = Self-Report of Delinquency; PCS = Psychopathy Content Scale; P-16 = Psychopathy-16 Scale. PCS 1 = callous/manipulative; PCS 2 = substance use/impulsivity; P-16 1 = callousness; P-16 2 = egocentricity; P-16 3 = antisociality; Ego 1 = confident; Ego 2 = exhibitionism/superiority; Ego 3 = conceit/assuredness.
*$p < .01$. **$p < .001$.

found to have unique effects in predicting violent outcomes (i.e., aggressive behavior, minor and major assault; OR = 1.67, 1.47, 1.41; Wald = 20.68, 6.55, 6.44, $p < .05$), whereas only the substance use/impulsivity factor showed unique effects for the remainder of nonviolent outcomes (i.e., vandalism, minor and major theft; OR = 1.32, 1.64, 1.77; Wald = 4.07, 10.37, 14.19, $p < .05$).

The three-factor model of the P-16 was evaluated in the same manner, showing that the antisociality factor (Factor 3) was significantly associated with each of the dependent variables (OR = 2.19, 1.68, 1.79, 2.13; Wald = 24.91, 9.35, 11.76, 16.44, $p < .01$ for delinquency, vandalism, minor and major theft; for violent outcomes, OR = 1.53, 1.73, 1.52; Wald = 12.13, 9.99, 7.20, $p < .01$ for aggressive behavior, minor and major assault, respectively). In contrast, callousness (Factor 1) showed unique associations only with vandalism and aggressive behavior (OR = 1.60, 1.47; Wald = 4.11 4.11 and 5.45, $p < .05$), whereas the egocentricity factor (Factor 2) was positively associated with the odds of engagement in delinquent behavior only (OR = 1.47; Wald = 4.72, $p < .05$).

Last, regression analyses examining the factor scores of the Egotistic scale revealed no unique relationships between confidence (Factor 1) and any dependent variables. Exhibitionism/superiority (Factor 2), in contrast, demonstrated significant associations with delinquency, minor and major theft (OR = 1.69, 1.29, 1.33; Wald = 20.38, 3.75, 4.43, $p < .05$), as well as with aggressive behavior (OR = 1.32; Wald = 9.50, $p < .01$). Of interesting, conceit/assuredness (Factor 3) was inversely related to all violent outcome variables (OR = .70, .55, .55; Wald = 8.49, 8.70 and 9.72, $p < .01$ for aggression, minor and major assault, respectively) as well as to delinquent behavior (OR = .65; Wald = 8.34, $p < .01$) and the odds of committing an act of vandalism (OR = .60; Wald = 4.63, $p < .05$).[3,4]

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[3]Analyses examining gender effects were conducted by entering psychopathy/narcissism scores and gender in the first block followed by the interaction term (e.g., PCS Factor 1 × Gender) between these variables in the second block. Results from these analyses revealed two significant interactions between gender and PCS factor scores on outcome. Specifically, PCS Factor 1 (callous/manipulative) was seen to have a stronger relationship with aggressive behavior for girls ($r = .58$) as compared to boys ($r = .33$). In addition, PCS Factor 2 (substance use/impulsivity) was more strongly related to the likelihood of committing an act of major theft for girls ($r = .67$) as compared to boys ($r = .31$).

[4]The pattern of results was similar when regression analyses were rerun excluding those youth who demonstrated significant elevations on any of the MACI validity indexes (i.e., Desirability and Debasement $T = 85$ or above, Disclosure $T = 5$ or below). One difference should be noted, however, when these participants were excluded: Factor 1 of the P-16 was no longer related to aggressive behavior.

DISCUSSION

Our study investigated the structure and predictive validity of three scales that show promise for assessing youth who are at risk for aggression and antisocial behaviors. Findings from exploratory and confirmatory factor analyses suggest that the psychopathy (PCS, P-16) and narcissism (Egotistic) subscales of the MACI are multidimensional in nature. The model that best fit the data for the PCS was consistent with Lexcen and colleagues' results and is conceptually similar to the factor structure of the PCL-R (Hare, 2003), with personality-based characteristics loading on one dimension and behavioral features on the second. However, there remain significant differences between the PCL-R and PCS such as the latter scale's inclusion of items assessing substance use. Nevertheless, it is interesting to note that a similar two-factor structure has been reported for other self-report measures such as the Psychopathic Personality Inventory (PPI; Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Lilienfeld & Andrews, 1996), as well as the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) with interpersonal and affective traits loading on one factor (i.e., PPI fearless dominance; APSD callous-unemotional) and behavioral features on the other (i.e., PPI impulsive antisociality; APSD impulsivity-conduct problems).

The theoretical model developed by Salekin and colleagues (2003) for the P-16 was not shown to be a satisfactory fit to the data in our study. Despite the efforts of Salekin and colleagues (2003) to represent Cooke and Michie's (2001) three-factor model in the P-16, a number of the item characteristics may present challenges in this regard. For example, most items on the P-16 antisociality factor pertain directly to the incidence of illegal behaviors, whereas the Impulsive and Irresponsible Behavior dimension of Cooke and Michie's model is composed of items assessing an impulsive, irresponsible, and stimulation-seeking behavioral pattern and is less concerned with whether these behaviors are overtly antisocial in nature. In addition, only six items on the P-16 are conceptually similar to items appearing on the APSD (Frick & Hare, 2001). Beyond these issues, it should be noted that there is still insufficient evidence to conclude that the three-factor model of psychopathy best fits in adolescent samples compared to alternate solutions (e.g., two- and four-factor models; Jones, Cauffman, Miller, & Mulvey, 2006; Neumann, Kosson, Forth, & Hare, 2006).

The final solution obtained for the Egotistic scale of the MACI, although also falling just short of an optimal fit, was consistent with the broad distinction that has been made in the literature between adaptive and maladaptive narcissism (Barry et al., 2003; Stolorow, 1986). Specifically, we found that one factor on this scale (i.e., conceit/assuredness) was consistently related to

decreased levels of delinquency and aggression. In addition, the factor solution obtained in our study was similar in content and structure to the three-factor model of the NPI (Washburn et al., 2004). This model posits three factors assessing features of authority, leadership, and self-sufficiency (first factor), exhibitionism and self-conceit (second factor), and exploitativeness (third factor). With respect to this finding, however, it is important to be mindful of the fact that different structural solutions have been reported for the NPI (e.g., three factors, Kubarych et al., 2004; four factors, Emmons, 1984; seven factors, Raskin & Terry, 1988), and no single factor structure has been consistently confirmed.

Subsequent correlation and regression analyses supported the multidimensionality of these measures by showing divergent patterns of association between the factors that composed the scales and dependent variables. It is interesting to note that divergent associations were found between the PCS factors and violent versus nonviolent outcomes. Once the shared variance between the two factors was controlled, only the callous/manipulative factor uniquely predicted concurrent indexes of aggressive behavior and assault, whereas the substance use/impulsivity factor predicted all nonviolent outcomes (i.e., delinquency, vandalism, and theft). In contrast, the callousness factor of the P-16 was associated with vandalism and aggression, and the egocentricity factor was related to delinquent behavior only. Only the antisociality factor of the P-16 (Factor 3) was uniquely associated with each of the dependent variables (i.e., violent and nonviolent outcomes).

However, items on the antisociality factor inquire directly about illegal behaviors, and therefore this factor may be confounded with criterion variables such as vandalism, theft, and assault. The problem of criterion-predictor contamination has been discussed in the psychopathy literature, particularly with respect to whether overt criminality is a legitimate part of the psychopathy construct or is simply a secondary consequence of the syndrome (Cooke, Michie, Hart, & Clark, 2004). In light of findings suggesting that the behavioral dimension of psychopathy, rather than the interpersonal or affective components, may be primarily responsible for psychopathy's robust association with recidivism (Corrado et al., 2004; Skeem & Mulvey, 2001), further research is required to disentangle the behavioral dimension of psychopathy from simple criminality.

With respect to the Egotistic scale, the confident factor (Factor 1) demonstrated no unique associations with any of the dependent measures. In contrast, exhibitionism/superiority (Factor 2) was significantly and uniquely associated with delinquency, minor and major theft, and aggression. As previously mentioned, conceit/assuredness (Factor 3) was uniquely and *inversely*

related to each of the violent dependent variables (i.e., aggression, minor and major assault) as well as to delinquency and vandalism. Youth who endorsed items reflective of "inflated" self esteem, specifically high self-assuredness and conceit, were less rather than more likely to behave aggressively. At the same time, however, supplemental moderation analyses failed to demonstrate that self-assuredness and conceit "buffered" adolescents against risk factors such as callousness as measured on the PCS and P-16. Thus, consistent with the idea that certain narcissistic features are adaptive when paired with high levels of self-esteem (Barry et al., 2003; Washburn et al., 2004), the features measured on the conceit/assuredness factor may reduce risk directly and may represent a form of inflated, albeit healthy adolescent self-esteem.

A limitation in many studies employing factor analytic techniques concerns issues of sample size. Our study's sample size of 173, although likely sufficient for testing the 20-item PCS and 16-item P-16, may have been slim for examining the factor structure of the 39-item Egotistic scale, and it prevented tests of factor invariance across gender (Bentler, 1988). Therefore, it is necessary to replicate our findings in a larger sample and to more directly test the generalizability of the factor structure for both boys and girls. It would also be informative to evaluate the generalizability of the results in other populations, including community-based, psychiatric, and forensic samples. This is particularly important given that several items were eliminated from the PCS and Egotistic scale to improve model fit, introducing the possibility that the final factor solutions were influenced by the unique characteristics of the current sample. In addition, prior studies have suggested that testing a hierarchical model of psychopathy (whereby each of the factors load onto a superordinate factor) is necessary to demonstrate that each dimension reflects a significant component of the psychopathy construct (Neumann et al., 2006). To date, however, the evidence regarding the fit of hierarchical models in youth data has been mixed, with no clear indication that imposing a higher order factor represents a significant improvement in model fit (Jones et al., 2006; Neumann et al., 2006). Second-order models were not tested in our study as the rules for model specification in structural equation modeling would not have been satisfied without imposing additional constraints on the models.

Finally, it is important to bear in mind that self-report measures were used to assess both the independent and criterion variables in the study. This type of design may inflate the relationships observed because of shared method variance. The study was also not longitudinal, and thus the "predictive" utility of the measures relates only to statistical prediction and not to prediction over time. A longitudinal design with

multiple information sources (e.g., self-report, parent or teacher ratings) would provide a stronger test of our study's research questions and represents an important avenue for future research.

Implications for Research, Policy, and Practice

Results from our study have important implications for the conceptualization and measurement of psychopathic and narcissistic personality features in adolescents. First, our findings are consistent with prior research that has conceptualized psychopathy and narcissism as multidimensional. In addition, these results underscore the importance of systematically examining the factorial validity of instruments used to measure psychopathic and narcissistic features in relation to clinical and criterion related validity. In our study, for example, the finding that different factors on the PCS, P-16, and Egotistic scales were differentially related to violent and antisocial outcomes highlights the importance of attending to factor structure and using this information in subsequent validity analyses.

Results such as these may also improve our ability to assess psychopathic and narcissistic personality features via self-report by identifying which items most reliably tap the underlying constructs and which are most related to critical outcomes such as violence and delinquency. Future research can then refine these scales so they serve as valid screening tools in at-risk adolescent samples. The development of structurally reliable scales will also facilitate the investigation of gender differences or even differences across cultures with respect to the manifestation of psychopathic and narcissistic personality traits. Therefore, as the literature on the use of self-report measures to assess psychopathic and narcissistic features grows, it remains important to determine an appropriate and replicable factor structure for these instruments to evaluate construct and clinical validity most effectively.

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