


# Assessing the Affective Features of Psychopathy in Adolescence: A Further Validation of the Inventory of Callous and Unemotional Traits

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## Abstract

To provide an extended assessment of the affective features of psychopathy, Frick developed the Inventory of Callous and Unemotional Traits (ICU), which is a multi-informant questionnaire. Previous studies have provided initial support for the self-report version. The aim of the present study is to investigate the validity of self- as well as other report versions of the ICU and examine associations with measures of psychopathic traits, empathy, antisocial behavior and prosocial attitudes, reward and punishment sensitivity, and personality traits in a Dutch community sample of 455 adolescents (56% males). The results of the present study replicate and extend previous findings on the psychometric properties and the validity of the ICU in a sample of nonreferred youth. The three ICU subscales showed distinctive patterns of associations with key external criteria. Implications and directions for future research are discussed.

## Keywords

psychopathy, callous and unemotional traits, adolescents, validation, assessment

Psychopathy is a personality disorder composed of interpersonal (e.g., conning/manipulative, grandiose sense of self-worth), affective (e.g., shallow affect, lack of remorse), and behavioral (e.g., antisocial behavior, proneness to boredom, lack of realistic long-term goals) features. The concept of psychopathy has made it possible to reliably identify a subpopulation of adult criminal offenders uniquely characterized by emotional detachment (Cleckley, 1976; Hare, 1998; Lykken, 1995). These individuals display low fearfulness, a callous misuse of others for personal gain, severe and violent patterns of antisocial behavior, and higher rates of recidivism (see Edens, Campbell, & Weir, 2007; Frick & Dickens, 2006; Frick & White, 2008; Leistico, Salekin, DeCoster, & Rogers, 2008, for recent reviews). The large bulk of psychopathy research has been conducted on adult forensic samples. However, there is an increasing interest in assessing potential childhood precursors to psychopathy in an effort to better understand the developmental processes that may lead to this serious form of personality disturbance and, hopefully, allow for preventive intervention (e.g., Frick & White, 2008; Lynam, 1996, 1998, 2002). There is growing evidence that at least one component of psychopathy, namely callous and unemotional (CU) traits (e.g., lack of guilt and empathy, poverty in emotional expression) designates an important and particularly severe subgroup of antisocial

youth at increased risk for future aggressive and violent behavior and poorer response to treatment (see, e.g., Frick & Dickens, 2006, for a review).

Based on this research, there is need for a reliable and valid tool to assess these traits. Two of the most widely used measures are the Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) and the Antisocial Process Screening Device (APSD; Frick & Hare, 2001). The PCL:YV combines a review of the person's institutional chart with a semistructured interview, making it time-consuming and limits its use in noninstitutional samples. Moreover, it contains only few items that specifically assess CU traits ( $n=4$ ). The APSD relies on parent, teacher (Frick & Hare, 2001), or self-report (Munoz & Frick, 2007) to assess CU traits and, as a result, is more applicable for clinical and nonclinical samples. However, the few items

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( $n = 6$ ) and limited number of response options (3) may restrict the range of scores on the measure. These limitations are likely the cause of the moderate internal consistencies reported, especially in studies using the self-report version (e.g., Falkenbach, Poythress, & Heide, 2003; Loney, Frick, Clements, Ellis, & Kerlin, 2003; Poythress et al., 2006). Furthermore, all but one item are worded in the positive direction, increasing the risk that ratings are influenced by a specific response set (Essau, Sasagawa, & Frick, 2006).

To overcome these limitations, Frick (2004) developed the Inventory of Callous and Unemotional Traits (ICU). The four items of the APSD that loaded consistently on the CU factor in clinic and community samples were expanded with six new items for each original item (three similar positively worded items and three similar negatively worded items). The resulting 24 items were put on a 4-point rating scale ranging from 0 (*not at all true*) to 3 (*definitely true*).

The first aim of the present study is to further examine the *factorial validity* of the scores of the ICU. Thus far, three studies have tested the internal structure of the ICU. Essau et al. (2006) conducted a factor analysis on data from a large community sample of 13- to 18-year-old nonreferred German adolescents and found evidence for a three-bifactor structure. The hallmark of such a model, which has recently also been used in adult psychopathy research (Patrick, Hicks, Nichol, & Krueger, 2007) is that, in addition to loading on subfactors, all items also load on a general "callous-unemotional" factor. Essau et al. (2006) found evidence for three subfactors, capturing different aspects of CU traits: "Callousness" (i.e., lack of empathy, guilt, and remorse for misdeeds), "Uncaring" (i.e., lack of caring about one's performance in tasks and for the feelings of others), and "Unemotional" (i.e., absence of emotional expression) all of which also load on a general "callous-unemotional" factor. Recently, Kimonis et al. (2008) replicated these results in a sample of adolescent offenders ( $n = 248$ ) using the English version of the instrument, and Fanti, Frick, and Georgiou (in press) replicated the same factor structure in a sample of nonreferred adolescents in Greek Cyprus ( $n = 347$ ). Taken together, the results of these three studies provide evidence for the generalizability of this factor structure across translations (German, English, Greek) and samples (nonreferred vs. institutional). However, only the self-report version of the scale was investigated in these studies, and no study has determined if the same factor structure would be obtained with parent and teacher ratings.

The second aim of the present study is to explore the *convergent validity* of the scores of the ICU with measures designed to tap similar personality traits, either measures specifically designed to tap psychopathic traits or measures of personality traits that have been theoretically related to the psychopathy construct (e.g., lack of empathy, reward sensitivity, Big Five personality traits). Kimonis et al. (2008) reported that the correlation between the ICU total score and the APSD CU scale, on which it was based, was  $r = .45$  ( $p <$

.05). However, its correlation with other measures of psychopathic traits in youth, such as the Childhood Psychopathy Scale (CPS; Lynam, 1997), has not yet been tested. In addition, associations with measures of empathy, sensitivity to reward and punishment, and Big Five personality traits were examined in the current study. As to the relation with empathy, previous research has indicated that both the ICU Uncaring and Unemotional subscales show negative associations with empathy (Kimonis et al., 2008). Taking into account multidimensional conceptualizations of empathy (see, e.g., Blair, 2005) in which emotional and cognitive empathy are distinguished, a multidimensional empathy measure was included in the present study. Sensitivity to reward and punishment have not yet been investigated in relation to ICU scores, but low fear and motivational imbalance models of psychopathy predict insensitivity to punishment and heightened reward dependency (see, e.g., Fowles, 1988; Lykken, 1957). Consistent with these predictions, children with conduct problems who also show CU traits, show response perseveration on computer tasks in which a reward-oriented response set is primed (e.g., Barry et al., 2000; O'Brien & Frick, 1996). As to the relation with Big Five personality traits, the most straightforward prediction is that CU traits are negatively associated with Agreeableness and Conscientiousness (see, e.g., Miller, Lynam, Widiger, & Leukefeld, 2001). In the study of Essau et al. (2006), however, there was some divergence between the ICU subscales in their pattern of correlations with Big Five personality traits. The Uncaring subscale showed the strongest associations with Big Five dimensions, namely showing strong negative associations with Conscientiousness and Agreeableness and moderate negative associations with Extraversion and Openness. The Callousness subscale showed moderate negative associations with Conscientiousness and Agreeableness but was unrelated to the other Big Five dimensions. The Unemotional subscale was negatively related to Extraversion, Agreeableness, and Emotional Instability and unrelated to Conscientiousness and Openness.

The third aim of the present study is to further explore the *criterion validity* of the scores of the ICU by examining the associations with antisocial behavior and lack of prosocial beliefs. Associations between ICU scores and aggressive and antisocial behavior have already been investigated by Essau et al. (2006), who found that only the Callousness and the Uncaring subscales were significantly associated with aggressive and antisocial behavior. Similar findings were reported by Fanti et al. (in press) in which both the Callousness and Uncaring dimensions were related to bullying behaviors, but only the Callousness scale was related to proactive aggression. Kimonis et al. (2008) found that aggression was more strongly associated with the Callousness dimension, whereas delinquent behavior was more strongly correlated with the Uncaring dimension. Thus, further study is needed to clarify the differential associations

of the ICU dimensions with antisocial behavior. In the current study, we also include a measure of prosocial beliefs. The rationale for this is that psychopathic traits not only influence an individual's behavior but also give rise to dysfunctional cognitive schemata. Theoretically, it can be expected that core beliefs associated with psychopathic traits are that one should look out for oneself and avoid victimization by being the aggressor and exploiter, that one is entitled to break social rules, and that getting one's deserts requires the manipulation of others (Blackburn, 2006).

Thus, the purpose of this study was to conduct a validation study for the ICU. Factorial validity of self- as well as other report versions of the ICU was examined. Convergent validity was explored through associations with measures of psychopathic traits, empathy, sensitivity to reward and punishment, and Big Five personality traits. In addition, criterion validity was examined through associations with antisocial behavior and lack of prosocial attitudes.

## Method

### Participants

Four hundred fifty-five adolescents and young adults (56% males) with a mean age of 16.67 years ( $SD = 1.34$ ; range = 14.17-20.58) were recruited from six high schools (both rural and urban) of Flanders, Belgium.<sup>1</sup> About 94% of the participants who were invited to take part in the study, actually participated (response rate: 93.9%). Reasons for not participating were lack of parental permission ( $n = 6$ ) or absence on the day of data collection ( $n = 30$ ). The data from two young adults were excluded because their age exceeded 21 years. Data from 101 participants were excluded because there were indications that they didn't take the task seriously (e.g., skipped many questions, admitted verbally that they answered randomly, handed in the questionnaires after a very short time), yielding a sample of 455 participants (i.e., 77% of the initially invited group).

Parents of all the participants were sent a letter inviting them to take part in the study. A total of 154 parents returned the parent report ICU (i.e., 34% of the initially invited group). For those adolescents whose parents completed the ICU, the teachers were also invited to participate. A total of 120 teachers returned the teacher report ICU (i.e., 78% of the initially invited group).<sup>2</sup>

The mean age of the fathers was 45.93 years ( $SD = 3.89$ ; range = 38-66), the mean age of the mothers was 44.17 years ( $SD = 4.00$ ; range = 33-59). The parents had a mean of 2.56 kids ( $SD = .93$ ; range = 1-7). Most of the parents were married (marital status: married 70%; divorced 15%; widowed 4.2%; never married 1.7%; unknown 9.1%). The educational levels of the fathers were as follows: 16.7% unknown, 1.7% 6th-grade education, 5% 9th-grade education, 41.7% 12th-grade education, and 35.0% had completed higher education. The

educational levels of the mothers were as follows: 20% unknown, 1.7% 6th-grade education, 3.3% 9th-grade education, 34.2% 12th-grade education, and 40.8% had completed higher education.

### Measures

The ICU (Frick, 2004) is a 24-item scale designed to assess CU traits in youth using self-, parent, or teacher report. The development and initial tests of its psychometric properties were described previously in the introduction. In addition to the scores of the three informants, "combined" scores were derived taking the higher of parent and teacher ratings for each item. This method for combining ratings is recommended in the manual of the APSD (Frick & Hare, 2001) and was originally proposed by Piacentini, Cohen, and Cohen (1992), based on several considerations. First, the report of any single informant who may not see the child in multiple situations will be limited. Second, the motivation to underreport the socially undesirable CU traits is more likely to be higher than the motivation to overreport these traits. Therefore, it does not seem justifiable to consider a trait as present only when both informants report it. Third, a child who scored high by multiple raters may not be more extreme on these traits than a child who scored high by only one rater. Discrepancies may be due to the fact that the situation in which one rater sees the child is not as likely to elicit these traits as another situation or may be due to the fact that the child is able to mask such behaviors in certain situations. As a result, a simple summative or averaging approach to combining information across informants does not seem justifiable (Frick, Cornell, Barry, Bodin, & Dane, 2003). The original English version of the ICU was translated into Dutch in collaboration with Cima and Feilhauer from the University of Maastricht, The Netherlands. The translation was conducted according to widely accepted guidelines for the successful translation of instruments in cross-cultural research (Brislin, 1970) and authorized and approved by the author of the original version of the instrument.

The APSD (Frick & Hare, 2001) is a 20-item rating scale designed to assess psychopathic traits in children and adolescents. It can be completed by parent, teacher, or self-report, but in the present study, we only used the self-report version. Factor analysis revealed a three-factor structure, comprising a Narcissism dimension (7 items; e.g., "You brag a lot about your abilities, accomplishments, or possessions"), an Impulsivity dimension (5 items; e.g., "You act without thinking of the consequences"), and a CU dimension (6 items; e.g., "You are concerned about the feelings of others," reverse scored). This structure was found (a) in both community and clinic-referred samples and (b) for self-report as well as the other report versions of the instrument (see, e.g., Bijttebier & Decoene, in press; Frick, Bodin, & Barry, 2000; Vitacco, Rogers, & Neumann, 2003).

Self-report APSD scores have been shown to be relatively stable over 3 years in a nonreferred sample (Munoz & Frick, 2007) and to be associated with greater aggression and violence (Kruh, Frick, & Clements, 2005) and with laboratory measures of deficient affective experiences (Loney et al., 2003). The reliability and the construct validity of the Dutch version of the APSD were supported by Bijttebier and Decoene (in press), who reported that the APSD subscales showed significant positive associations with measures of disruptive behavior disorders in a community sample of children.

The CPS (Lynam, 1997) consists of 55 items with a dichotomous response format (yes/no). It assesses psychopathic traits in children and adolescents by parent or self-report. In the present study, only the self-report version was used. There is evidence for a two-factor structure with an "interpersonal/affective" (Factor 1) and a "social deviance" (Factor 2) facet (Lynam et al., 2005). Bijttebier and Decoene (in press) demonstrated that the Dutch version of the CPS showed adequate reliability and criterion validity, as evidenced by measures of disruptive behavior disorders in a community sample of children.

The Interpersonal Reactivity Index (IRI; Davis, 1980) is a 28-item self-report scale designed to measure dispositional empathy as a set of separate but related constructs. The Perspective Taking scale addresses one's tendency to take the psychological point of view of others in everyday life (e.g., "When I am upset at someone, I usually try to 'put myself in his shoes' for a while"). The Fantasy scale addresses the tendency to imaginatively transpose oneself into fictional situations (e.g., "I really get involved with the feelings of the characters in a novel"). The Empathic Concern scale taps feelings of sympathy and compassion for unfortunate others (e.g., "When I see someone being taken advantage of, I feel kind of protective toward them"), whereas the Personal Distress scale addresses the tendency to experience distress in stressful situations (e.g., "In emergency situations, I feel apprehensive and ill-at-ease"). The IRI has demonstrated good intrascale and test-retest reliability as well as convergent validity (Davis, 1980). De Corte, Buysse, and Verhofstadt (2007) demonstrated that the Dutch version of the IRI has an adequate internal consistency, a similar factor structure to the English version, and provided evidence for the construct validity (i.e., associations with emotional intelligence, Big Five personality traits [Openness, Neuroticism, and Agreeableness], and self-esteem).

Antisocial behavior and prosocial beliefs were measured by means of the Social and Health Assessment (SAHA; Schwab-Stone et al., 1995; Schwab-Stone et al., 1999; Weissberg, Voyce, Kaspro, Arthur, & Shriver, 1991). The SAHA is a comprehensive self-report survey developed for epidemiological school-based research. It has been used in a number of cross-cultural studies in young people aged 12 to 18 years, some of which used the Dutch version (e.g.,

Vermeiren et al., 2003; Vermeiren, Jones, Ruchkin, Deboutte, & Schwab-Stone, 2004). In this study, we included two subscales of the Dutch version of the SAHA, of which the internal consistency has been reported to be satisfactory (Vermeiren et al., 2004). The Antisocial Behavior scale consists of 22 items, assessing the frequency of behaviors related to vandalism, carrying a weapon, theft with direct personal contact, and assault during the past year (*0 time, 1 time, 2 times, 3-4 times, or 5 or more times*). A total score is derived by summing the 22 items. The Prosocial Beliefs scale of the SAHA consists of 10 items: 7 items have been derived from the Disapproval of Deviancy Scale from the School Health Study (Jessor, Donovan, & Costa, 1989) and 3 items ("hurting someone badly"; "being a look-out for a drug dealer"; and "carrying a gun") have been added by the developers of the SAHA (Weissberg et al., 1991). Respondents were asked to rate on a 4-point Likert-type scale how wrong it is to be involved in various antisocial activities (e.g., stealing, lying, damaging property, hurting someone badly in a fight, starting a fistfight). A total score ranging from 10 to 40 can be calculated, with higher scores corresponding to the higher disapproval of antisocial behavior.

The BIS/BAS scales (Carver & White, 1994) were used to measure individual differences in reactivity of the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS). The BIS/BAS scales consist of 24 items to be rated on a 4-point Likert-type scale. The BIS scale assesses the tendency to experience negative affect or behavioral inhibition when cues of threat are present (e.g., "I worry about making mistakes"). Three BAS scales assesses the tendency to experience strong positive affect or behavioral approach when cues of incentive are present: Reward Responsiveness reflects the degree to which rewards lead to positive emotions (5 items, e.g., "It would excite me to win a contest"); Drive reflects the tendency to actively pursue appetitive goals (4 items, e.g., "I go out of my way to get things I want"); Fun Seeking reflects the tendency to seek out and impulsively engage in potentially rewarding activities (4 items, e.g., "I crave excitement and new sensations"). The Dutch version possesses adequate reliability and construct validity, as evidenced by associations with Eysenck's personality dimensions (Extraversion, Neuroticism, and Psychoticism) and impulsivity (Franken, Muris, & Rassin, 2005).

The Big Five Inventory (BFI; John & Srivastava, 1999) is a 44-item questionnaire designed to measure the Big Five personality traits: Neuroticism, Extraversion, Openness to Experience, Conscientiousness, and Agreeableness. Participants are asked to rate their agreement with each statement regarding their perceptions of themselves in a variety of situations, using a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert-type scale. John and Srivastava (1999) reported that the scales of the BFI demonstrated good internal consistency (mean  $\alpha = .83$ ) and convergent validity with corresponding scales of Goldberg's (1992) adjectives and NEO-Five Factor



Inventory (McCrae & Costa, 1992). Denissen, Geenen, van Aken, Gosling, and Potter (2008) provided evidence for the psychometric quality of the Dutch version in terms of factorial equivalence to the original version, as well as internal consistency of the five subscales.

### Procedure

School approval, adolescents' willingness to participate, and parental written informed consent were obtained from all participants before participation in the study. Adolescents' participation was voluntary, and no incentives were given. The adolescents completed the questionnaires in their classroom during regular school time and the order of administration of the questionnaires was counterbalanced across classrooms. Research assistants were available to provide assistance if necessary and to ensure independent responding. The average time needed for completing the questionnaires was 60 minutes. The parents and teachers were free to fill in the questionnaire at whatever moment they found time for it, and they returned the questionnaires in sealed envelopes.

## Results

### Overview of Statistical Analyses

First, the factor structure of the ICU was examined by means of confirmatory factor analysis using the LISREL (8.7) framework (Jöreskog & Sörbom, 2004). The goodness of fit was evaluated based on several fit indices (Schermele-Engel, Moosbrugger, & Müller, 2003), namely the  $\chi^2$  test statistic, the root mean square error of approximation (RMSEA; Steiger, 1990), the comparative fit index (CFI; Bentler, 1990), the goodness-of-fit index (GFI; Jöreskog & Sörbom, 1989; Tanaka & Huba, 1984), the adjusted GFI (Jöreskog & Sörbom, 1989), the Akaike information criterion (AIC), and the consistent AIC (CAIC; Akaike, 1987). The fit indices were selected on the basis that they (a) are derived from diverse concepts of model fit (i.e., goodness of fit and information criterion) and (b) are used and are comparable to the models in previous studies (Essau et al., 2006; Fanti et al., in press; Kimonis et al., 2008). An adequate fit is indicated by  $\chi^2/df$  ratio between 2 and 3, RMSEA of .10 or lower, CFI and GFI values exceeding .90, and AGFI values exceeding .85 (Schermele-Engel et al., 2003; Schumacker & Lomax, 1996). The model with the minimum values of AIC and CAIC is regarded as the best fitting model (Schermele-Engel et al., 2003). Second, the internal consistency of the ICU scores was investigated by means of Cronbach's alpha coefficient. According to Barker, Pistrang, and Elliott (1994), reliability coefficients <.60 are considered insufficient, .60 to .69 marginal, .70 to .79 acceptable, .80 to .89

good, and  $\geq .90$  excellent. Third, Pearson correlations were used to investigate associations of the ICU total score and subscales with psychopathic traits, empathy, BIS and BAS sensitivity, Big Five personality traits, antisocial behavior, and prosocial beliefs. Fourth, the unique variance accounted for in all external criteria by the three ICU subscales was tested by partial correlations, showing each subscale's association controlling for the other two subscales.

### Factor Structure

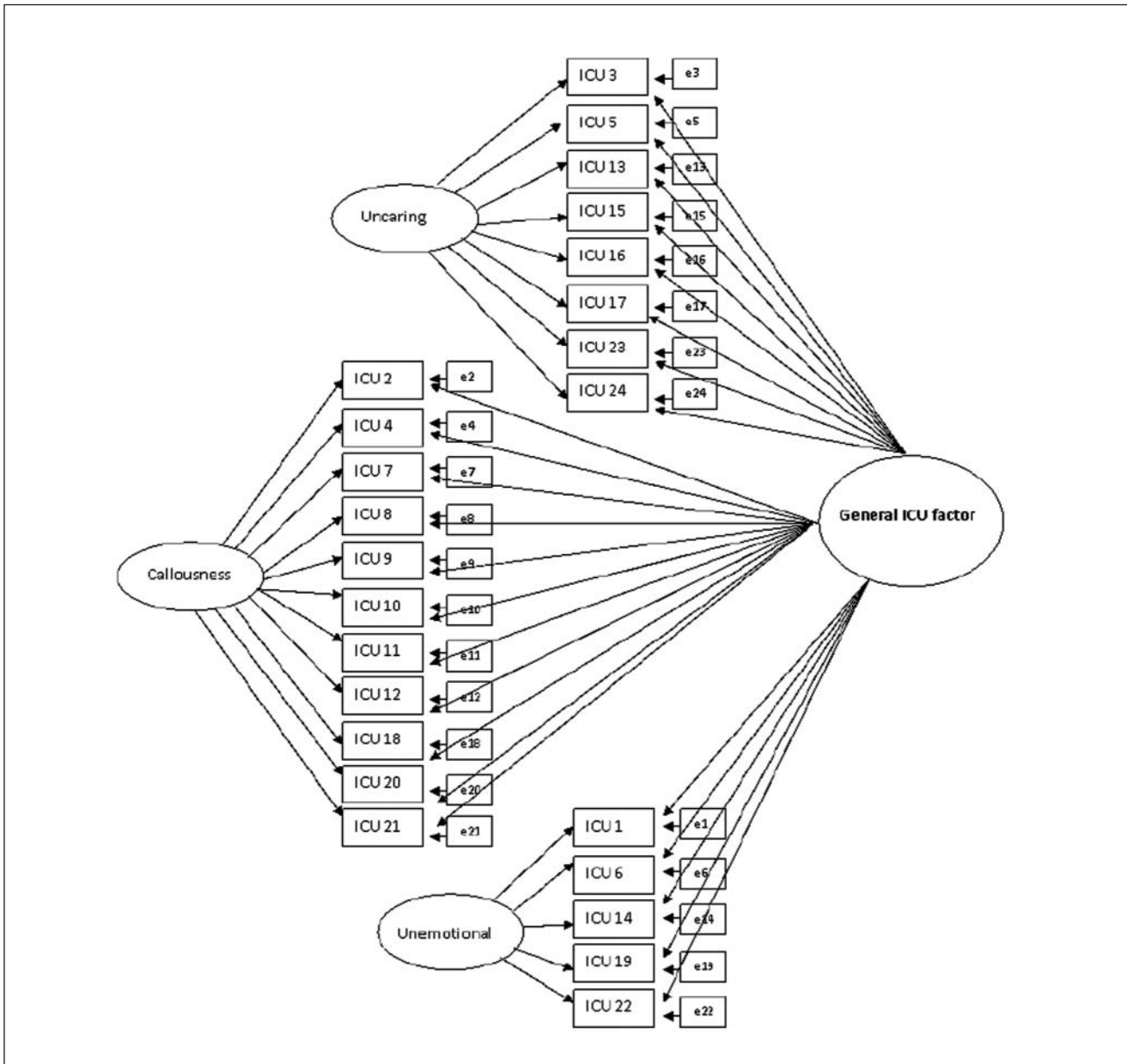
For each version of the ICU (self, parent, teacher, and combined), three models were compared: a single-factor model in which all items loaded on a single CU factor (Model 1), a three-factor model in which ICU items load on three inter-correlated factors—callousness, uncaring, and unemotional—(Model 2), and a three-bifactor model proposing that all items load on a general CU dimension as well as on three distinct factors (Model 3, see Figure 1).

The fit indices for each model for all versions are shown in Table 1.

For Model 1, the fit indices did not reach an acceptable level for any of the versions. Model 2 showed an insufficient fit for the parent and teacher versions but a nearly acceptable fit for the self-report and combined versions. Model 3 emerged as the best-fitting model in all versions, showing adequate model fit indices for the self-report, parent report, and combined version and nearly acceptable fit for the teacher report version. The fact that the GFIs and AGFIs reach an acceptable level of fit only for Model 3 for the self-report version may be because of the smaller sample size for the combined, parent report, and teacher report versions. These indices depend on sample size (Schermele-Engel et al., 2003). For each version, the three models were statistically compared with each other using pairwise  $\chi^2$  difference tests. All tests were significant at  $p = .0001$  and indicated that Model 3 was superior to Model 2 and that Model 2 was superior to Model 1 for all versions of the scale. In the interest of space, further analyses were limited to the self-report and combined versions.

### Descriptive Statistics

Internal consistencies (Cronbach's  $\alpha$ ), means, and standard deviations of all measures included in the correlational analyses are shown in Table 2. With regard to the ICU, the internal consistency of the scores of all three subscales and of the total scale is in the "acceptable" to "good" range. Alpha coefficients tend to be somewhat higher for the combined version than for self-report version. As to the other instruments (all of them being self-report measures), all but three (sub)scales have a sufficient internal



**Figure 1.** Visual representation of the three-bifactor model  
 Note: ICU = Inventory of Callous and Unemotional Traits.

consistency. For the scores on the APSD Callous–Unemotional subscale and the BAS Reward Responsiveness and Fun Seeking subscales, the internal consistency was low, probably because of the small number of items in these scales.

**Convergent Validity**

Associations with self-reported psychopathic traits (APSD, CPS), empathy (IRI), BIS and BAS sensitivity (BIS/BAS scales), and Big Five personality traits (BFI) for both the total

score and the subscale scores of self-report and combined ICU are shown in Table 3. Because the three subscales of the ICU were highly correlated (self-report:  $r_{\text{callousness-uncaring}} = .39$ ,  $r_{\text{callousness-unemotional}} = .20$ ,  $r_{\text{uncaring-unemotional}} = .30$ ; combined report:  $r_{\text{callousness-uncaring}} = .66$ ,  $r_{\text{callousness-unemotional}} = .23$ ,  $r_{\text{uncaring-unemotional}} = .18$ ), correlations for the subscales were computed showing both the zero-order associations and partialing the effects of the other two subscales. These partial correlations allow us to examine the unique relations that each subscale bears to the relevant convergent validity measures.

**Table 1.** Fit Indices for the Three Models Tested

	$\chi^2$	$\chi^2/df$	RMSEA	CFI	GFI	AGFI	AIC	CAIC
ICU self <sup>a</sup>								
Model 1	2133.43	8.47	0.13	0.77	0.72	0.66	2229.49	2475.21
Model 2	998.95	4.01	0.08	0.89	0.85	0.81	1100.95	1362.09
Model 3	674.53	2.96	0.07	0.92	0.89	0.86	818.53	1187.20
ICU parent <sup>b</sup>								
Model 1	1070.74	4.25	0.15	0.76	0.63	0.56	1166.74	1360.51
Model 2	722.49	2.90	0.11	0.85	0.72	0.66	824.49	1030.37
Model 3	375.12	1.65	0.07	0.93	0.83	0.78	519.12	809.78
ICU teacher <sup>c</sup>								
Model 1	1297.01	5.15	0.19	0.78	0.52	0.43	1393.01	1574.81
Model 2	816.34	3.28	0.14	0.86	0.64	0.56	4000.29	4091.19
Model 3	534.03	2.34	0.11	0.90	0.73	0.64	678.03	950.73
ICU combined <sup>c</sup>								
Model 1	901.61	3.58	0.15	0.84	0.61	0.54	997.61	1179.41
Model 2	574.55	2.31	0.10	0.92	0.71	0.65	676.55	869.71
Model 3	348.31	1.53	0.07	0.96	0.80	0.74	492.31	765.01

Note: AGFI = adjusted goodness of fit; AIC = Akaike information criterion; CAIC = consistent AIC; CFI = comparative fit index; GFI = goodness of fit; RMSEA = root mean square error of approximation. *df* Model 1 = 252; *df* Model 2 = 249; *df* Model 3 = 228. ICU = Inventory of Callous and Unemotional Traits.

a. Based on the data from the entire data set ( $n = 455$ ).

b. Based on the data from the data set where only participants with a parent report were included ( $n = 154$ ).

c. Based on the data from the data set where only participants with a parent and a teacher report were included ( $n = 120$ ).

The ICU total score shows positive associations with all three APSD subscale scores and all two CPS subscale scores. For APSD, the association of the CU subscale with the ICU total score is stronger than that with the other two subscale scores. For CPS, both subscale scores show similar associations with the ICU total score. These positive associations with the APSD/CPS emerge for the Callousness and Uncaring subscales, with the highest intercorrelation between the ICU Uncaring score and the APSD CU score. In contrast, for the ICU Unemotional subscale, the associations between APSD/CPS scales are only significant for the self-report version. When partialing the other ICU subscales, this pattern remains to a certain degree, although most correlations with the combined report version of the ICU drop to nonsignificant levels and for the Unemotional scale only the association with the CU scale of the APSD remains significant.

Negative associations with the subscale scores of the IRI are shown for the ICU total score, supporting the inverse relationship between CU traits and interpersonal responsiveness. The strongest associations are found for the IRI Empathic Concern and Perspective Taking scores. Again, the ICU subscales differ from each other with respect to the strength of their associations with IRI subscales, with the strongest associations emerging between the self-reported ICU Uncaring subscale and the IRI Empathic Concern and—to a somewhat lesser extent—Perspective Taking subscales (this remains after partialing the other ICU subscales).

The ICU total score of the self-report version is significantly associated with all four BIS/BAS scales, showing positive correlations with BAS Fun Seeking and BAS Drive and negative associations with BIS and BAS Reward Responsiveness. This pattern of associations largely emerged also at subscale level. However, the associations with BIS, BAS Fun Seeking and BAS Drive are limited to the Callousness and Uncaring subscales. After partialing the other ICU subscales, more distinct patterns of associations emerge, especially for the self-report version of the ICU. First, the associations with BIS only emerge for the ICU Callousness and Uncaring scales and not for the ICU Unemotional scale. Second, the association with BAS Reward Responsiveness only emerges for the ICU Unemotional scale and not for the other two ICU scales. Third, BAS Drive and BAS Fun Seeking are positively associated with ICU Callousness and Uncaring but negatively associated with ICU Unemotional.

Strong negative associations are shown between the ICU total score and the personality dimensions of Agreeableness and Conscientiousness. In addition to that, smaller but still significant negative associations with Neuroticism, Openness, and Extraversion emerge for the self-report version of the ICU. An inspection of the pattern of the bivariate correlations of the self-report ICU subscales reveals that these associations emerge more clearly for the ICU Uncaring and Callousness subscales and are far weaker (in the combined version even absent) for the ICU Unemotional subscale. Through the partial

**Table 2.** Means (*M*), Standard Deviations (*SD*), Theoretical Range, and Internal Consistencies ( $\alpha$ ) of All Scales Included in the Correlational Analyses

	<i>M</i>	<i>SD</i>	Theoretical Range	$\alpha$
<b>ICU</b>				
ICU Callousness self-report	8.01	5.24	0-33	.79
ICU Callousness combined	9.83	6.11	0-33	.84
ICU Uncaring self-report	9.13	4.05	0-24	.77
ICU Uncaring combined	12.54	4.77	0-24	.87
ICU Unemotional self-report	6.92	3.11	0-15	.73
ICU Unemotional combined	8.68	2.94	0-15	.77
ICU Total self-report	24.05	9.17	0-72	.83
ICU Total combined	31.05	10.98	0-72	.89
<b>APSD</b>				
APSD (total score)	13.52	6.14	0-40	.82
Impulsivity	4.34	2.15	0-10	.62
Narcissism	4.29	2.58	0-14	.67
Callous and Unemotional	3.55	2.08	0-12	.55
<b>CPS</b>				
CFS Factor 1	2.40	1.03	0-7	.67
CPS Factor 2	1.99	1.05	0-6	.64
CPS total score	3.45	1.36	0-14	.77
<b>SAHA</b>				
Antisocial behavior	8.43	9.25	0-88	.86
Prosocial beliefs	32.79	6.15	10-40	.85
<b>BIS/BAS</b>				
BIS (total score)	13.69	3.76	0-21	.73
BAS Reward Responsiveness	12.53	1.69	0-15	.46
BAS Drive	7.40	2.31	0-12	.65
BAS Fun seeking	8.41	1.96	0-12	.50
<b>IRI</b>				
Empathic Concern	16.62	4.46	0-28	.73
Fantasy	15.48	6.01	0-28	.81
Perspective Taking	14.46	4.68	0-28	.69
Personal Distress	11.08	4.14	0-28	.66
<b>BFI</b>				
Extraversion	28.86	5.82	8-40	.82
Agreeableness	30.65	5.41	9-45	.73
Conscientiousness	28.30	6.13	9-45	.80
Neuroticism	23.64	5.69	8-40	.78
Openness	32.56	6.29	10-50	.70

Note: APSD = Antisocial Process Screening Device; BFI = Big Five Inventory; BIS/BAS = Behavioral Inhibition System and Behavioral Activation System scales; CPS = Child Psychopathy Scale; ICU = Inventory of Callous and Unemotional Traits; IRI = Interpersonal Reactivity Index; SAHA = Social and Health Assessment.

correlations, a more clear insight into the distinct patterns of associations is gained. The Uncaring scale shows strong negative associations with Agreeableness and Conscientiousness and a smaller but still significant negative association with Openness; however, the latter was only significant for the self-report version of the ICU. The ICU Callousness scale shows in the self-report version small but significant negative associations with both Neuroticism and Agreeableness. Finally, the ICU

Unemotional scale shows only one significant association with personality, namely a negative association with Extraversion.

Not unexpectedly, associations of the ICU combined scores with APSD, CPS, IRI, BIS/BAS scales, and BFI are considerably lower than associations of the ICU self-report version. To a certain degree, however, the pattern of associations remains unchanged, albeit often dropping to nonsignificant levels at ICU subscale level.



Table 3. Correlations Between the ICU Scores and APSD, CPS, IRI, BIS/BAS, and BFI<sup>a</sup>

	ICU Total			ICU Callousness			ICU Uncaring			ICU Unemotional		
	Self	Combined		Self	Combined		Self	Combined		Self	Combined	
APSD												
Impulsivity	.51**	.33**		.44** (.31**)	.34** (.20*)		.48** (.36**)	.30** (.11)		.15** (-.02)	.04 (-.05)	
Narcissism	.49**	.24**		.52** (.44**)	.21* (.10)		.35** (.18**)	.20* (.08)		.13** (-.01)	.12 (.07)	
Callous and Unemotional	.68**	.36**		.50** (.34**)	.33** (.14)		.63** (.51**)	.36** (.19**)		.35** (.20**)	.09 (.01)	
APSD total score	.71**	.40**		.62** (.52**)	.38** (.19*)		.60** (.48**)	.37** (.17)		.25** (.06)	.11 (.02)	
CPS												
CPS FI	.49**	.25**		.40** (.25**)	.25** (.14)		.51** (.42**)	.23* (.09)		.12* (-.07)	.04 (-.02)	
CPS F2	.49**	.22*		.36** (.19**)	.24** (.13)		.53** (.45**)	.24** (.11)		.15** (-.02)	-.07 (-.14)	
CPS total score	.49**	.21*		.38** (.23**)	.22* (.16)		.52** (.43**)	.16 (.02)		.14** (-.04)	.06 (.01)	
IRI												
Empathic Concern	-.55**	-.31**		-.37** (-.19**)	-.28** (-.19*)		-.53** (-.41**)	-.18 (.02)		-.31** (-.18**)	-.27** (-.23*)	
Fantasy	-.27**	-.14		-.19** (-.10*)	-.14 (-.07)		-.24** (-.17**)	-.15 (-.07)		-.14** (-.07)	.01 (.05)	
Perspective Taking	-.39**	-.22*		-.25** (-.10*)	-.22* (-.11)		-.44** (-.37**)	-.22* (-.11)		-.15** (-.02)	.02 (.07)	
Personal Distress	-.24**	-.20*		-.12** (-.02)	-.14 (.01)		-.24** (-.18**)	-.21* (-.16)		-.19** (-.13**)	-.09 (-.05)	
BIS/BAS scales												
BIS total	-.38**	-.22*		-.36** (-.27**)	-.23* (-.13)		-.33** (-.21**)	-.22* (-.09)		-.10* (.03)	.02 (.08)	
BAS Fun Seeking	.26**	.16		.23** (.15**)	.14 (.01)		.30** (.25**)	.21* (.16)		-.01 (-.12**)	-.02 (-.06)	
BAS Reward Responsiveness	-.19**	-.08		-.13** (-.08)	-.13 (-.14)		-.12** (-.04)	-.05 (.05)		-.19** (-.15**)	.05 (.08)	
BAS Drive	.23**	.16		.25** (.18**)	.16 (.05)		.24** (.19**)	.19* (.12)		-.04 (-.14**)	-.04 (-.08)	
BFI												
Extraversion	-.15*	.03		-.04 (.00)	.08 (.02)		-.05 (.05)	.15 (.15)		-.32** (-.32**)	-.29** (-.33**)	
Agreeableness	-.52**	-.35**		-.35** (-.17**)	-.33** (-.19*)		-.55** (-.46**)	-.28** (-.08)		-.23** (-.07)	-.15 (-.08)	
Conscientiousness	-.38**	-.35**		-.22** (-.06)	-.35** (-.20*)		-.45** (-.39**)	-.33** (-.14)		-.16** (-.02)	-.02 (.07)	
Neuroticism	-.21**	-.10		-.21** (-.18**)	-.08 (-.03)		-.11* (-.00)	-.07 (-.03)		-.12** (-.08)	-.07 (-.06)	
Openness	-.21**	-.17		-.12** (-.04)	-.14 (-.07)		-.21** (-.15**)	-.11 (-.02)		-.15** (-.09)	-.14 (-.12)	

Note: APSD = Antisocial Process Screening Device; BFI = Big Five Inventory; BIS/BAS = Behavioral Inhibition System and Behavioral Activation System scales; CPS = Child Psychopathy Scale; ICU = Inventory of Callous and Unemotional Traits; IRI = Interpersonal Reactivity Index.

a. Partial correlations are given in parentheses.

\*\* $p < .05$ . \*\*\* $p < .01$ .

**Table 4.** Correlations Between the ICU Scores and Antisocial Behavior and Prosocial Beliefs<sup>a</sup>

	ICU Total		ICU Callousness		ICU Uncaring		ICU Unemotional	
	Self	Combined	Self	Combined	Self	Combined	Self	Combined
Antisocial behavior	.45**	.26**	.39** (.27**)	.22* (.05)	.42** (.31**)	.28** (.18*)	.13** (-.02)	.05 (-.01)
Prosocial beliefs	-.47**	.27**	-.33** (-.17**)	-.23* (-.07)	-.51** (-.42**)	-.28** (-.17)	-.16** (.00)	-.06 (.00)

Note: ICU = Inventory of Callous and Unemotional Traits.

a. Partial correlations are given in parentheses.

\* $p < .05$ . \*\* $p < .01$ .

### Criterion Validity

Associations of self-report and combined ICU scores with self-reported antisocial behavior and prosocial beliefs are shown in Table 4.

The ICU total score shows a significant positive association with antisocial behavior and a significant negative association with prosocial beliefs. At subscale level, these associations emerge especially for the ICU Callousness and Uncaring subscales and are far weaker (or even absent) for the Unemotional subscale. When partialing the other ICU subscales, this patterns of associations remains for the self-report version of the ICU. When using the combined ICU, only the association between ICU uncaring and antisocial behavior is significant.

### Discussion

Prior studies have noted the importance of at least one component of psychopathy, namely CU traits to designate a subgroup of severely antisocial youth. The present study aimed at investigating the reliability and validity of the scores of a new instrument designed to provide an extended assessment of CU traits: the ICU (Frick, 2004). Although the evidence of previous validation studies is promising (Essau et al., 2006; Fanti et al., in press; Kimonis et al., 2008), these studies were limited because they only used the self-report version of the ICU. As far as we know, the present study is the first to investigate the validity of all versions of the ICU (self-report, parent report, teacher report, and combined).

The first aim of the present study was to further examine the *factorial validity* of the scores on the ICU. Consistent with previous studies (Essau et al., 2006; Fanti et al., in press; Kimonis et al., 2008), a three-bifactor structure shows the best fit for the self-report, parent report, teacher report, and combined version. In such a model, all items of the ICU load on a general CU factor as well as on three distinct factors (Callousness, Uncaring, Unemotional; see Figure 1). This three-bifactor model is clearly superior to a single-factor model and approach acceptability for the self-report and the combined versions but is insufficient for the parent report and teacher report versions. The internal

consistencies of the scores of the ICU subscales and of the total ICU score are in the “acceptable” to “good” range, and tend to be somewhat higher for the combined than for the self-report version. Taken together, these results support the factor structure found previously for the self-report ICU (Essau et al., 2006; Fanti et al., in press; Kimonis et al., 2008) and suggest that it can be extended to other ICU versions.

The second aim of the present study was to explore the *convergent validity* of the scores of the ICU. The analyses were conducted for the ICU total score as well as for the three subscale scores. As to the latter, partial correlations were also used to investigate the unique associations of each subscale with the convergent validity measures.

The ICU total scores show significant positive associations with APSD and CPS scores. An inspection of the unique variance accounted by the three ICU subscales reveals that this is largely due to the associations that the Callousness and Uncaring subscales have with the other psychopathy measures. The Unemotional subscale is largely unrelated to the other psychopathy measures, which may suggest that this subscale taps aspects of (psychopathic) personality that is not adequately captured by other measures.

The fact that all subscales of the multidimensional empathy measure (IRI, Davis, 1980) show negative correlations with the ICU total score further supports the construct validity. Consistent with the description of psychopathic individuals as characterized by “a profound lack of empathy and a callous disregard for the feelings, rights and welfare of others” (Hare, 2003, p. 35), the two IRI subscales that show the strongest associations with ICU are Empathic Concern and Perspective Taking. At ICU self-report subscale level, the ICU Uncaring subscale seemed to have the strongest associations with this measure of empathy.

In line with evidence indicating that CU traits are associated with insensitivity to punishment (Lykken, 1957), a negative association is found between the BIS and the total ICU score. Interestingly, the total ICU score shows a divergent pattern of associations with different aspects of sensitivity to reward: positive associations emerge with BAS Fun Seeking and BAS Drive, but a negative association is found with BAS Reward Responsiveness.

Adolescents who describe themselves as showing higher levels of CU traits also describe themselves as having a more active tendency to pursue appetitive goals (Drive) and to impulsively engage in potentially rewarding activities (Fun Seeking), but indicate having less positive emotions following a reward (Reward Responsiveness) in comparison with adolescents with lower ICU scores. The latter finding needs to be interpreted in light of past studies showing that children high on CU traits seem to be more sensitive to cues to reward on computer tasks (e.g., Barry et al., 2000; O'Brien & Frick, 1996). One explanation relates to the fact that the BAS Reward Responsiveness measures a child's self-reported emotions following reward, not the influence of reward contingencies directly. Thus, children with CU traits may show increased sensitivity to rewards but may not show or be aware of the emotional experience associated with this tendency.

The unique relations of the ICU self-report subscales with the BIS/BAS subscales reveals that the ICU subscales differ from each other with respect to their associations with temperament. The ICU Callousness and Uncaring subscales are positively related to BAS Fun Seeking and BAS Drive, negatively related to BIS and unrelated to BAS Reward Responsiveness. The ICU Unemotional scale shows negative associations with all three BAS scales and is unrelated to BIS.

Thus, there appears to be a complex pattern of associations between CU traits and temperamental reactivity, especially for BAS sensitivity, that requires further research to clarify, for example through research using laboratory measures of a child's sensitivity to rewards and punishments (Blair, Morton, Leonard, & Blair, 2006). However, this complex pattern of associations is consistent with the many inconsistencies in the literature with respect to the role of reward and punishment sensitivity in psychopathy. Some researchers have argued that the reward-related processing capacities of individuals with psychopathic traits are unimpaired (Lykken, 1957) or even of superior quality (Fowles, 1988), whereas others have argued that individuals with psychopathic traits do show deficits in reward processing (Blair et al., 2006). Similar contradictory views have been put forward with respect to the expected associations between BIS/BAS and psychopathy. According to Lykken (1995), primary psychopathy is associated with a hyporeactive, weak BIS and a normal BAS. However, others have argued that primary psychopathy is associated with a weak BIS and a strong BAS (e.g., Pickering & Gray, 1999; Ross et al., 2007). These different hypotheses concerning the associations between psychopathic traits and BAS reactivity may result from the fact that—compared with BIS—BAS is less clearly identified at a neurophysiological, emotional, motivational, and behavioral level (Leone, 2009). Because concerns

about the BIS/BAS scales were expressed for both the BAS scale (Heubeck, Wilkinson, & Cologon, 1998; Jorm et al., 1999) and the BIS scale (Poythress et al., 2008), it would be important to include additional measures of behavioral activation and inhibition (either questionnaires or laboratory tasks). By doing that, it would be possible to determine to what extent the findings of the current study are specific to the measure we used.

The correlations of the ICU total score with Big Five personality traits are consistent with the results of previous research, showing that psychopathic traits show strong inverse correlations with the Big Five dimensions of Agreeableness and Conscientiousness (e.g., Miller et al., 2001). An inspection of the associations at subscale level for the self-report ICU shows that this pattern of associations mainly characterizes the Uncaring subscale, whereas the other two subscales tend to have somewhat different personality correlates. The Callousness subscale shows an inverse correlation with Agreeableness and Neuroticism, whereas the Unemotional subscale shows a fairly strong inverse correlation with Extraversion.

The *criterion validity* of ICU scores was examined through associations with antisocial behavior and prosocial beliefs. In line with expectations and consistent with previous research (see, e.g., Frick & Dickens, 2006), the ICU total score shows positive associations with antisocial behavior and negative associations with prosocial attitudes. At subscale level, this pattern of associations is largely due to the Callousness and Uncaring subscales, which is consistent with past research (Essau et al., 2006; Fanti et al., in press; Kimonis et al., 2008). Thus, the Unemotional subscale of the ICU seems to largely tap factors specifically related to emotional expression (e.g., lack of empathic concern) that are independent of antisocial behavior.

Although it is interesting to speculate on the distinctive patterns of associations of the ICU subscales with key external criteria, it is important that these findings would be replicated in other samples. Also, whereas the ICU is made up of equal numbers of positively and negatively worded items, the Callousness subscale consists largely of negatively worded items, and the Uncaring subscale consists largely of positively worded items. Thus, it is possible that method variance related to response styles, rather than construct variance, may have contributed to the grouping of items for these two subscales, despite the fact that they may capture very similar dimensions. Given that thus far the body of evidence regarding the psychometric properties of the ICU is still limited, it would be premature to start revising the measure based on the results of only this study. More research using different versions of the ICU in diverse samples is needed.

All the associations with the (self-report) validity measures were also investigated for the combined version of the

ICU, and the pattern of results is largely similar, although they were somewhat weaker. The fewer significant correlations with the combined version are likely due to smaller sample with data for the combined version ( $n = 120$ ) than with data for the self-report version ( $n = 455$ ). Also, the higher correlations with the self-report version are likely due in part to shared method variance because the external criteria used to test the validity of ICU were also self-report. It is important to note that correlation between the self-report and combined version of the ICU was  $r = .43$ , which is consistent with correlations found in past studies of personality ratings (Van Leeuwen, Mervielde, Braet, & Bosmans, 2004).

The results of the current study need to be interpreted in light of several weaknesses. First, this study is limited by its correlational design, precluding the ability to investigate causal relationships and to rule out important third variables. Future research, using longitudinal designs and/or testing mediational models, are needed to further clarify the relations of CU traits with other variables. Second, the participants in this study were nonreferred youth. Future studies are needed to compare the distribution of scores on the ICU traits and their associations in various settings such as those in clinical or referred samples. Also, as noted previously, the present study demonstrated a complex pattern of associations between CU traits and temperamental reactivity. It would be important to further explore this association with different types of measures, for example, cortisol levels as index of stress reactivity (see, e.g., Holi, Auvinen-Lintunen, Lindberg, Tani, & Virkkunen, 2006) or laboratory measures of reward and punishment sensitivity (see, e.g., Ávila, 2001).

Overall, the present study supports a growing body of research suggesting that ICU is a promising assessment instrument for CU traits in youth that may overcome some of the psychometric limitations of past measures. A reliable and valid tool to assess the CU traits is important because the presence of these traits appears to designate an important and particularly severe subgroup of antisocial youth. The ICU can be a useful instrument to identify CU traits and as such foster the understanding of the developmental processes of antisocial behavior, as well as potentially guide the development of more targeted treatment programs for antisocial behavior and aggression (Frick, 2006).

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