

RESEARCH ARTICLE

Associations between callous-unemotional traits and psychopathology in a sample of adolescent females

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Abstract

Background: Callous-unemotional (CU) traits (e.g., lack of empathy and guilt, deficient affect) have been associated with severe and persistent patterns of conduct problems and antisocial behaviour as well as with poorer treatment outcomes. They are now a specifier to the diagnosis of conduct disorder. **Objective:** To examine the associations between CU traits and a wide set of psychopathological symptoms (e.g., anxiety, conduct disorder) in a sample of adolescent females. **Method:** 200 adolescent females ($M = 15.55$ years, $SD = 1.64$) recruited from French high schools located in Montreal, Quebec, Canada ($n = 150$) and from units/resources managed by the Montreal Youth Center ($n = 50$) self-reported on their levels of CU traits and psychopathological symptoms. **Results:** Participants recruited from high schools, compared to their counterparts from the youth center, had lower scores on most of the scales and subscales of CU traits and psychopathology. The total score of CU traits as well as the callousness-uncaring dimension were correlated with externalizing symptoms for the participants from the schools and from the youth center. However, the total score of CU traits as well as the unemotional dimension were correlated with internalizing symptoms especially among participants from the schools. **Conclusions:** Our analyses revealed differences in the patterns of associations depending on the subscales of CU traits and across sample types (i.e., school subsample versus youth center subsample), which should be considered in the assessment of psychopathology in these populations.

Key Words: *callous-unemotional traits, psychopathology, adolescent females, community sample, clinical sample*

Résumé

Contexte: Les traits d'insensibilité émotionnelle (IE) (p. ex., manque d'empathie, faible sentiment de culpabilité, affect déficient) sont associés à des problèmes de conduite et des comportements antisociaux graves et persistants ainsi qu'à une plus faible réponse au traitement. Ils sont maintenant utilisés à titre de spécificateur du trouble des conduites. **Objectif:** Examiner les associations entre les traits IE et un vaste ensemble de symptômes psychopathologiques (p. ex., anxiété, trouble des conduites) dans un échantillon d'adolescentes. **Méthode:** Deux cents adolescentes ($M = 15,55$ ans, $ET = 1,64$) recrutées dans des écoles secondaires francophones de Montréal, Québec, Canada ($n = 150$) et dans des services/ressources du Centre jeunesse de Montréal ($n = 50$) ont autorapporté leurs niveaux de traits IE et leurs symptômes psychopathologiques. **Résultats:** Les participantes recrutées dans les écoles secondaires, comparées à leurs homologues

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du centre jeunesse, avaient des scores plus faibles à la plupart des échelles et des sous-échelles de traits IE et de psychopathologie. Le score total des traits IE de même que la dimension insensibilité-indifférence étaient corrélés avec les symptômes extériorisés pour les participantes des écoles et du centre jeunesse. Cependant, le score total des traits IE ainsi que la dimension insensibilité-indifférence étaient corrélés avec les symptômes intériorisés plus spécifiquement chez les participantes des écoles. **Conclusions:** Les analyses révèlent différents patrons d'associations en fonction des sous-échelles de traits IE et des types d'échantillons (c.-à-d., le sous échantillon de l'école comparativement au sous-échantillon du centre jeunesse), qui devraient être pris en compte dans l'évaluation de la psychopathologie au sein de ces populations.

Mots clés: *traits d'insensibilité émotionnelle, psychopathologie, adolescentes, échantillon communautaire, échantillon clinique.*

Introduction

The construct of psychopathic traits, which refers to a range of affective (e.g., lack of empathy and guilt, deficient affect), interpersonal (e.g., manipulation and lying), and behavioural/lifestyle (e.g., risk taking, antisociality) personality traits (1), has been extended to younger populations with the aim of identifying youth most at-risk of presenting high levels of these traits later in adulthood (2). Since then, a comprehensive body of research has been conducted on the affective dimension of psychopathic traits in youth, referred to as callous-unemotional (CU) traits (see Frick and colleagues (3) for an extensive review). In samples of children and adolescents, studies have notably showed that higher levels of CU traits are associated with particularly severe and persistent patterns of conduct problems and antisocial behaviour, as well as with poorer treatment outcomes (3,4). This advance in scientific knowledge led to the inclusion of four symptoms referring to CU traits (i.e., lack of remorse or guilt, callous – lack of empathy, unconcerned about performance at school or work, shallow or deficient affect) in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (5). As a result, clinicians may now specify the diagnosis of conduct disorder as with “limited prosocial emotions” (5,6).

Although CU traits have been identified as an important risk factor for severe and persistent externalizing problems, concerns have been raised in the past years regarding the validity of their assessment. These concerns emerged as researchers using assessments of the global construct of psychopathic traits, such as the Antisocial Process Screening Device (APSD) (7), reported relatively low internal consistency of CU subscales (8,9). To address these psychometric limitations, the APSD CU subscale was expanded to create the Inventory of Callous-Unemotional Traits (ICU), an instrument specifically designed to assess this dimension of psychopathic traits in youth (10).

Recent meta-analytic work suggested that both the internal consistency and external validity of the ICU total and subscales (i.e., callousness, uncaring, and unemotional) scores were acceptable, with one exception: in a number of studies, the unemotional subscale was weakly or even not significantly correlated with outcomes typically associated with CU traits such as externalizing problems, including in adolescent females (11,12). Apart from this exception, several studies, in which the widely used self-report version of the ICU was administered to adolescents, showed significant associations between the ICU scores and externalizing behaviour, such as aggression, conduct problems, and delinquency, both among samples from the community (13-15) and samples drawn from detention/juvenile centers (16,17). Across these studies, females tend to show lower ICU scores than males. Socialization processes could be one important factor explaining sex differences in average levels of CU traits and externalizing symptoms (18). Still, their ICU scores are reported to be associated with externalizing problems, hence suggesting that CU traits are meaningful in identifying females who are at-risk for externalizing symptoms (14,16,19).

Females are also prone to experience internalizing symptoms (e.g., depression, anxiety) that co-occur with externalizing symptoms (20). However, evidence regarding the associations between ICU scores and internalizing problems appears to be less documented than for externalizing symptoms, especially among females. In this population, only a few studies included findings on the associations between ICU scores and internalizing psychopathology, focusing mostly on anxiety-related problems (e.g., compared to depression). For instance, Pechorro and colleagues (14) reported non-significant associations between ICU scores (total score as well as the callousness, uncaring and unemotional dimensions) and social anxiety among Portuguese adolescent females drawn from the community. Similar non-significant associations between ICU scores and social

anxiety were reported in another study by Pechorro and colleagues (18), in which the sample included adolescent females from both forensic and school contexts. When exploring the associations between the ICU and internalizing symptoms among a sample exclusively composed of females residing in a youth detention center in Belgium, Colins and colleagues (12) reported non-significant associations between the ICU total score and psychiatric disorders (affective disorders and anxiety disorders) as well as between the ICU total score and withdrawn-depressed feelings. However, they found a significant and *negative* association between the ICU total score and the anxious-depressed scale of the Youth Self-Report (21). The associations between the unemotional subscale and the different internalizing disorders and problems were not significant. These results underline the importance of considering sample types (e.g., from the community or clinical) when examining these associations as well as the need to examine the associations between ICU scores (total scores and subscales) and both anxiety and depression-related problems, as these could differ. Expanding the exploration of the associations between the ICU scores and other forms of psychopathological symptoms, including symptoms particularly prevalent among adolescent females (e.g., eating disorders) (22), also appears as an important research goal.

In addition, examining such associations could contribute to advancing knowledge about heterogeneity among individuals with CU traits, especially the existence of two variants of CU traits based on the presence or absence of high levels of anxiety (23-24). Based on theoretical assumptions and clinical work, CU traits are expected to be negatively associated with anxiety (primary variant of CU traits) (3,23). Low levels of fearfulness (e.g., low fearful responses to punishment following a behaviour that broke a social norm), a trait related to anxiety, may be one important risk factor for the development of CU traits. Individuals with the primary variant may be particularly prone to act intentionally to attain their goals (proactive aggression) (25). However, research has also found no significant association or a positive association between CU traits and anxiety (26), suggesting that some youth present with CU traits *and* anxiety symptoms (secondary variant of CU traits). One potential factor explaining this comorbid symptomatology is exposure to environmental adversity such as childhood maltreatment (23,24).

Two main research gaps were targeted in the design of the current study. First, only a few studies focused on the associations between ICU scores and psychopathology among females. Second, those studies (or those that focused on results separately across sexes) often only considered a few

specific (e.g., aggression or delinquency) or broad, unspecific (e.g., externalizing problems) constructs (13,15). Investigating the associations between ICU scores and a more holistic set of psychopathological problems in adolescent females, including specific internalizing symptoms, appears warranted to obtain an understanding of the patterns of associations between CU traits and psychopathology. Further, as previous studies consistently showed higher levels of CU scores in clinical/institutionalized versus community samples (27), and as the associations could differ across sample types (e.g., regarding their associations with internalizing problems, as suggested by studies reviewed above), a focus on adolescent females coming from different backgrounds appears important.

Considering these research gaps, the objective of this study was to examine the associations between CU traits and a wide set of psychopathological problems among adolescent females drawn from distinct backgrounds (i.e., high schools and youth center units/resources). We hypothesized that the levels of CU scores and psychopathological symptoms, and possibly the patterns of associations between CU scores and psychopathological symptoms, would differ across the two subsamples. More specifically, we expected to find higher scores of CU traits and psychopathological symptoms in adolescent females recruited from the youth center units/resources compared to the participants recruited from high schools. We also expected that the ICU scores (and especially callousness-uncaring traits) and externalizing symptoms would be positively correlated in both subsamples, as higher levels of CU scores have been associated with higher levels of externalizing symptoms in females from clinical settings (12) as well as from the community (14). Given the limited knowledge on the associations between ICU scores and internalizing symptoms in females, the analyses examining such associations were explorative. Still, because adolescent females under the care of the socio-judicial system may be involved in more violent proactive aggression, a characteristic often linked to the primary CU variant, we anticipated that the associations between CU traits and internalizing problems (especially anxiety) would be non-significant or inversely correlated among this subsample. Finally, based on previous research, we expected to find weak (or even null) correlations between the unemotional dimensions and externalizing as well as internalizing symptoms.

Method

Participants

A total of 200 females participated in this study (ages 13-20 years old; $M = 15.55$, $SD = 1.64$). A subsample of the participants was recruited from four French high schools

located in Montréal, Québec, Canada ($n = 150$): 91 participants were recruited from two public high schools, 40 from a private high school and 19 from a specialized high school for pregnant adolescent females or young mothers who wanted to pursue their high school education. Another subsample was recruited from units/resources managed by the Montreal Youth Center ($n = 50$), a center for child and youth protection and rehabilitation. The Montreal Youth Center provides services primarily in accordance with the Youth Protection Act, the Youth Criminal Justice Act and the Act Respecting Health Services and Social Services. Among the participants who reported on their ethnocultural group ($n = 167$; 33 participants did not report this information), 47.9% identified themselves as Caucasian, 18.6% as African Canadian, 8.4% as Latina or Mexican, 6.6% as Arab, 3.6% as Asian, 13.2% as Mixed and 1.8% as Other. The two subsamples did not differ statistically in terms of age [schools: $M = 15.47$; youth center: $M = 15.80$; $F(1,198) = 1.52, p = .22$] and ethnocultural group [Caucasian as compared to all other groups; schools: 46.9% and 53.1%; youth center: 51.4% and 48.6%; $\chi^2(1, N = 167) = 0.23, p = .63$]. The sampling process was aimed at recruiting adolescent females from different psychosocial backgrounds.

Procedures

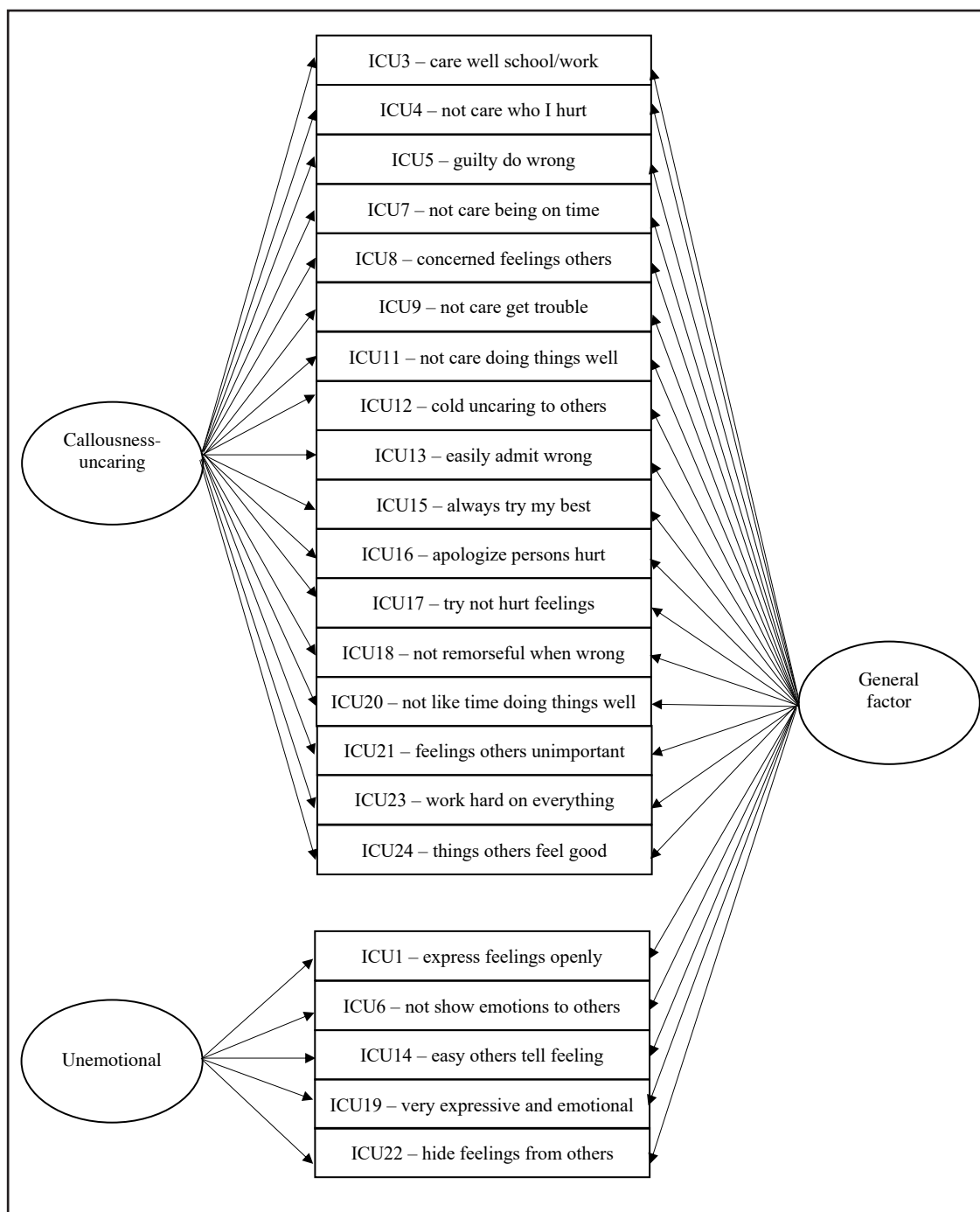
The Institutional Review Board at the University of Montreal and at the Montreal Youth Center approved this study. The Montreal School Board as well as the principals of the schools provided agreement to participate in the study. We obtained written informed consent from the legal guardians (e.g., parents) and the participants under the age of 18, and from participants only who were aged 18 years or older or who were emancipated minors (because they had a child). The participants received C\$20 as a compensation for taking part in the study. The participants completed questionnaires individually at a convenient place (at school, at home or at their youth center unit) and time for them. Data collection, which included other measures that were not used in the present study (e.g., tasks on emotion identification and emotional response to stimuli), lasted a maximum of around two hours. All instruments were administered in French.

Measures

CU Traits. The participants completed the ICU (10) French-North American self-report version, which has been approved by Paul Frick, who initially designed the instrument (see <https://faculty.lsu.edu/pfricklab/icu.php>). Previous research has found good reliability and validity of the ICU in community samples and in samples of adolescent offenders (13,16). The instrument includes 24 items (e.g., ‘The feelings of others are unimportant to me’). Items were scored on

a four-point rating scale, from ‘not at all true’ to ‘definitely true’. Previous studies suggested that a general-specific model with three specific factors (callousness, uncaring, and unemotional) or two specific factors (callousness-uncaring and unemotional) best fitted the ICU (13,16,28). In the current study, we relied on the total scale based on the 24 items of the ICU and the two ICU dimensions identified by Henry and colleagues (28) (see Figure 1). The internal consistency (ordinal alphas) (29) of the ICU total scale and the two dimensions ranged between .78 and .86 for the total sample (see Table 1).

Psychopathology. The participants completed the Mental Health and Social Inadaptation Assessment for Adolescents (MIA) (31), a self-report instrument for quantifying the frequency of mental health and psychosocial adaptation problems using a dimensional approach and based on the DSM-5 (5). The version of the instrument used in the current study included 114 questions covering the past 12 months. The participants rated the frequency at which they experienced symptoms of social phobia, attention deficit hyperactivity disorder (ADHD), generalized anxiety, eating disorders, conduct disorder, depression, delinquency and contact with police, oppositional defiant disorder, psychopathy, and aggression. A total score of internalizing symptoms was obtained by summing the items from the following scales: social phobia, generalized anxiety, and depression. Of note, items from the MIA self-harm scale ($n = 3$) (31) were not part of the current data collection. A total score of externalizing symptoms was obtained by summing the items from the following scale: ADHD, conduct disorder, delinquency and contact with police, oppositional defiant disorder, and aggression. Items of the psychopathology scales were answered on a three-point Likert-type scale (‘never true’, ‘sometimes true’, ‘always true’). In addition, an interference with functioning score according to four contexts (family, school, peer relationships, and daily life) was calculated for each of the following problems: anxiety, behaviour problems, eating disorders, and depression. A total functioning impairment score was calculated by summing the items from the four functioning impairment scales. Items were scored on a four-point rating scale, from ‘not at all’ to ‘a lot’. Table 1 presents the number of items for each scale and subscale. Previous research, based on data from the Quebec Longitudinal Study of Child Development (QLSCD) when the participants were 15 years old, showed adequate internal validity and reliability of the MIA (31). The internal consistency (ordinal alphas) of the scales and subscales for the total sample ranged between .69 and .97, except for psychopathy (.31; see Table 1).

Figure 1. Two-factor general-specific model of the Inventory of Callous-Unemotional Traits (ICU)

Note. We focused on the two ICU dimensions identified by Henry and colleagues (28) with confirmatory factor analysis (CFA): callousness-uncaring ($n = 17$ items; notably referring to lack of empathy for others, lack of remorse for hurting others and lack of concern for others' feelings) and unemotional ($n = 5$ items; indexing impoverished, shallow and altered emotional experience and expression). These two dimensions reflect a parsimonious factor solution and the strong association between the callousness and the uncaring dimensions with each other. Henry and colleagues (28) withdrew two items from the callousness-uncaring dimension of the ICU ("right and wrong is different from what other people think" and "do not let feelings control me") because the item-total correlations suggested that they were unrelated to the remaining items of the scale. Therefore, these two items were not included in the callousness-uncaring dimension of the current study. Using the current data and Mplus software (version 8.6) (30), we performed CFA to replicate the two-factor general-specific model identified by Henry and colleagues (28) and we obtained adequate fit ($\chi^2 = 311.93$, $df = 187$, $p = .001$, $CFI = 0.92$, $RMSEA = 0.058$, $SRMR = 0.07$).

Table 1. Descriptive Statistics of the Study Variables

	Total sample		School subsample		Youth center subsample		p'	Cohen d			
	Alpha	M	SD	Alpha	M	SD					
CU traits											
Total score (24) ^a	.84	23.35	8.52	.86	22.42	8.58	.78	26.12	7.77	.008	-0.45
Callousness-unemotional (17)	.86	12.82	6.89	.86	11.88	6.72	.83	15.67	6.69	.001	-0.57
Unemotional (5)	.78	7.77	3.27	.77	7.79	3.20	.74	7.72	3.49	.901	0.02
MIA psychopathology scales^b											
Social phobia (8)	.88	4.02 ^c	2.50	.87	3.98	2.44	.89	4.13 ^c	2.69	.717	-0.06
ADHD (16)	.87	4.22	1.85	.87	3.82	1.76	.80	5.42	1.59	.001	-0.95
Impulsivity (6)	.83	4.04	2.37	.82	3.46	2.20	.73	5.77	2.01	.001	-1.10
Hyperactivity (4)	.69	3.36	2.46	.70	3.01	2.42	.53	4.42	2.29	.001	-0.60
Inattention (6)	.72	4.91	2.02	.73	4.66	2.01	.64	5.65	1.89	.002	-0.51
Generalized anxiety (9)	.80	6.24 ^c	2.04	.80	6.20	2.04	.80	6.37 ^c	2.08	.616	-0.08
Eating disorders (5)	.70	3.09 ^c	2.20	.72	3.02	2.13	.63	3.31 ^c	2.40	.436	-0.13
Conduct disorder (16)	.93	1.35	1.45	.84	0.94	1.02	.91	2.60	1.80	.001	-1.13
Lying (5)	.79	1.64	1.58	.78	1.43	1.44	.76	2.26	1.82	.001	-0.51
Stealing (5)	.88	0.70	1.37	.68	0.46	0.95	.88	1.43	2.02	.001	-0.61
Rule breaking (4)	.91	2.20	2.84	.83	1.24	1.94	.83	5.06	3.17	.001	-1.45
Vandalism (2)	.73	0.60	1.38	.64	0.32	0.93	.62	1.45	2.03	.001	-0.72
Depression (8)	.87	5.48	2.34	.88	5.16	2.31	.83	6.41	2.22	.001	-0.55
Delinquency and contact with police (5)	.95	0.80	1.93	.97	0.27	1.25	.85	2.39	2.64	.001	-1.03
Oppositional defiant disorder (9)	.83	3.17	1.85	.81	2.74	1.68	.73	4.47	1.74	.001	-1.01
Psychopathy (4)	.31	3.10 ^c	1.73	.40	2.98	1.76	.44	3.49 ^c	1.59	.068	-0.30
Aggression (18)	.96	1.20	1.36	.96	0.91	1.11	.93	2.08	1.65	.001	-0.83
Severe physical violence (5)	.94	0.52	1.46	.96	0.28	1.07	.89	1.23	2.13	.001	-0.56
Proactive aggression (4)	.90	0.54	1.31	.93	0.26	0.94	.80	1.39	1.80	.001	-0.79
Reactive aggression (3)	.87	1.12 ^c	2.10	.88	0.76	1.85	.75	2.24 ^c	2.44	.001	-0.68
Social aggression (6)	.83	2.26	1.81	.84	1.96	1.66	.81	3.18	1.96	.001	-0.67
Total of internalizing symptoms (25) ^c	.91	5.29 ^c	1.85	.91	5.16	1.79	.92	5.67 ^c	1.98	.090	-0.27
Total of externalizing symptoms (64) ^d	.97	2.23	1.36	.97	1.84	1.10	.95	3.40	1.40	.001	-1.24

continued

Table 1. continued

	Total sample		School subsample		Youth center subsample			Cohen d			
	Alpha	M	SD	Alpha	M	SD	p'				
CU traits											
Functional impairment scales											
Anxiety (4)	.83	3.67	2.69	.83	3.12	2.47	.81	5.31	2.68	.001	-0.85
Behaviour problems (4)	.91	1.85	2.44	.89	1.22	2.01	.81	3.75	2.67	.001	-1.07
Eating disorders (4)	.93	2.79	2.68	.92	2.62	2.53	.91	3.28	3.06	.131	-0.24
Depression (4)	.91	4.04	3.01	.90	3.43	2.85	.84	5.88	2.76	.001	-0.87
Total functional impairment (16)	.92	2.88	2.03	.91	2.39	1.82	.86	4.34	1.93	.001	-1.04

^a The number of items for each scale is presented in parentheses.
^b In line with the data presented by Côté and colleagues (31), all MIA scores were rescaled to be expressed on a scale from 0 to 10.
^c Internalizing symptoms include items from the following scales: social phobia, generalized anxiety and depression.
^d Externalizing symptoms include items from the following scales: ADHD, conduct disorder, delinquency and contact with police, oppositional defiant disorder and aggression.
^e Data are missing for one participant.
^f p-values associated with ANOVA analyses performed to examine mean differences between the two subsamples.
 CU: callous-unemotional
 ADHD: attention deficit hyperactivity disorder.
 MIA: Mental Health and Social Inadaptation Assessment for Adolescents

Analyses

We first performed descriptive analysis (mean and standard deviation) to examine the mean score of each scale and subscale of the ICU and the MIA for the total sample as well as for the two subsamples (i.e., school and youth center) separately. We also used analysis of variance (ANOVA) to compare means between the subsamples for each scale and subscale of the ICU and the MIA. We used Pearson correlations to examine the associations between the ICU and the MIA scores. We performed the correlations separately for each of the subsamples. The analyses were conducted using Statistical Package for the Social Sciences software, version 27 (32).

Results

Table 1 presents the means, standard deviations, and p-values associated with ANOVA analyses performed to examine mean differences between the two subsamples (i.e., school and youth center) for the scales and subscales of CU traits and psychopathological symptoms. Compared to their counterparts recruited from the youth center, the participants from the schools had significantly lower scores on most of the scales and subscales of CU traits and psychopathology, with small to large effect sizes (Cohen's *ds* ranging from -0.45 to -1.45). The means of the two subsamples did not significantly differ for seven scales, including unemotional traits, generalized anxiety, eating disorders, and the total score of internalizing symptoms.

Tables 2 and 3 present the intercorrelations between the CU traits and the psychopathology scales for the school subsample and the youth center subsample, respectively. Five main findings are noticeable from these tables. First, the correlations between the callousness-uncaring dimension and the unemotional dimension were weak (school subsample) or null (youth subsample). Second, for both subsamples, the total score of CU traits was significantly and positively correlated with the following scales: conduct disorder, oppositional defiant disorder, psychopathy, aggression, and the total score of externalizing symptoms. Third, for both subsamples, the unemotional dimension of CU traits was not significantly correlated with conduct disorder, oppositional defiant disorder, and aggression. However, for the participants from the school subsample, the unemotional dimension was significantly and positively correlated with social phobia, depression, and the total score of internalizing symptoms. For the participants

Table 2. Intercorrelations (Pearson's r) between CU Traits and Psychopathology Scales (School Subsample)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. CU traits (total score)	-															
2. Callousness-uncaring	<u>.92</u>	-														
3. Unemotional	<u>.60</u>	<u>.26</u>	-													
4. Social phobia	.24	.16	.28	-												
5. ADHD	<u>.32</u>	<u>.35</u>	<u>.05</u>	<u>.14</u>	-											
6. Generalized anxiety	<u>.02</u>	<u>-.03</u>	<u>.08</u>	<u>.29</u>	<u>.44</u>	-										
7. Eating disorders	<u>.13</u>	<u>.12</u>	<u>.07</u>	<u>.05</u>	<u>.35</u>	<u>.52</u>	-									
8. Conduct disorder	<u>.35</u>	<u>.41</u>	<u>.00</u>	<u>.06</u>	<u>.50</u>	<u>.09</u>	<u>.14</u>	-								
9. Depression	.23	.17	.22	<u>.35</u>	<u>.53</u>	<u>.72</u>	<u>.39</u>	.21	-							
10. Delinquency and contact with police	.21	.26	<u>-.01</u>	<u>.02</u>	.25	<u>-.08</u>	<u>-.07</u>	<u>.58</u>	<u>-.03</u>	-						
11. Oppositional defiant disorder	<u>.50</u>	<u>.54</u>	<u>.11</u>	<u>.11</u>	<u>.62</u>	.26	<u>.30</u>	<u>.68</u>	<u>.38</u>	<u>.35</u>	-					
12. Psychopathy	<u>.67</u>	<u>.61</u>	<u>.41</u>	<u>.05</u>	<u>.11</u>	<u>-.08</u>	<u>.04</u>	<u>.30</u>	<u>.08</u>	.23	<u>.34</u>	-				
13. Aggression	<u>.41</u>	<u>.46</u>	<u>.03</u>	<u>.10</u>	<u>.53</u>	<u>.06</u>	<u>.11</u>	<u>.67</u>	<u>.17</u>	<u>.69</u>	<u>.68</u>	<u>.29</u>	-			
14. Total of internalizing symptoms	<u>.21</u>	<u>.13</u>	.24	<u>.70</u>	<u>.46</u>	<u>.83</u>	<u>.39</u>	<u>.15</u>	<u>.86</u>	<u>-.04</u>	<u>.31</u>	<u>.02</u>	<u>.14</u>	-		
15. Total of externalizing symptoms	<u>.45</u>	<u>.50</u>	<u>.05</u>	<u>.13</u>	<u>.82</u>	.26	.26	<u>.82</u>	<u>.39</u>	<u>.60</u>	<u>.85</u>	<u>.29</u>	<u>.86</u>	<u>.32</u>	-	
16. Total functional impairment	.24	<u>.20</u>	<u>.13</u>	<u>.09</u>	<u>.35</u>	<u>.55</u>	<u>.43</u>	<u>.27</u>	<u>.48</u>	<u>.09</u>	<u>.39</u>	.26	<u>.18</u>	<u>.46</u>	<u>.35</u>	-

Correlations significant at $p \leq .001$ are underlined.
 Correlations significant at $p \leq .01$ are in bold.
 Correlations significant at $p \leq .05$ are in italics.
 CU: callous-unemotional.
 ADHD: attention deficit hyperactivity disorder.

from the youth center subsample, the correlations between the unemotional dimension and social phobia, eating disorders and depression were above .20, but did not reach the level of statistical significance. Fourth, the total score of CU traits was not correlated with generalized anxiety – this finding was particularly evident for the school subsample for which the correlation was close to zero ($r = .02$, $p = .846$). For the youth center subsample, the correlation was small and negative ($r = -.21$, $p = .151$), but did not reach the threshold for statistical significance (i.e., $p \leq .05$). Fifth, for the participants from the schools only, the total score of CU traits was significantly and positively correlated with social phobia, ADHD, depression, the total score of internalizing symptoms, and the total score of functional impairment.

Table 4 shows the correlations among CU traits and the functional impairment subscales for both subsamples. For the school subsample, the total score of CU traits and the callousness-uncaring dimension were significantly and positively correlated with the anxiety and the behaviour problems functional impairment scales, whereas for the youth center subsample, only the callousness-uncaring dimension was significantly and positively correlated with the behaviour problems functional impairment scale. Of note, we also performed the analyses without the participants recruited from the specialized high school for pregnant adolescent females or young mothers ($n = 19$) to examine their potential influence on the results. The patterns of findings were maintained. We therefore relied on all the participants recruited from high schools ($n = 150$) in this study. The participants recruited from the specialized high school for pregnant adolescent females or young mothers had higher scores than the participants recruited from other high

Table 3. Intercorrelations (Pearson's r) between CU Traits and Psychopathology Scales (Youth Center Subsample)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. CU traits (total score)	-															
2. Callousness-uncaring	<u>.88</u>	-														
3. Unemotional	<u>.47</u>	.02	-													
4. Social phobia	.02	-.09	.24	-												
5. ADHD	.20	.26	-.04	.41	-											
6. Generalized anxiety	-.21	-.26	.04	<u>.55</u>	.26	-										
7. Eating disorders	.04	-.10	.26	<u>.50</u>	.25	<u>.46</u>	-									
8. Conduct disorder	<u>.45</u>	<u>.51</u>	-.02	-.11	.44	-.08	.03	-								
9. Depression	-.04	-.18	.23	<u>.61</u>	<u>.56</u>	<u>.62</u>	<u>.46</u>	.11	-							
10. Delinquency and contact with police	.25	.40	-.23	-.20	.35	-.22	-.13	<u>.67</u>	-.05	-						
11. Oppositional defiant disorder	<u>.58</u>	<u>.68</u>	-.02	.15	<u>.51</u>	.04	.05	<u>.58</u>	.09	.44	-					
12. Psychopathy	<u>.56</u>	.45	.35	-.08	.17	-.17	-.05	.16	-.12	.20	.39	-				
13. Aggression	<u>.58</u>	<u>.56</u>	.18	-.05	.41	-.18	-.09	<u>.65</u>	-.01	<u>.57</u>	<u>.64</u>	<u>.55</u>	-			
14. Total of internalizing symptoms	-.09	-.21	.20	<u>.86</u>	<u>.48</u>	<u>.84</u>	<u>.56</u>	-.04	<u>.86</u>	-.19	.11	-.14	-.09	-		
15. Total of externalizing symptoms	<u>.53</u>	<u>.60</u>	.00	.06	<u>.70</u>	-.04	.04	<u>.86</u>	.20	<u>.73</u>	<u>.78</u>	.38	<u>.85</u>	<u>.08</u>	-	
16. Total functional impairment	-.04	-.10	.12	.35	.40	<u>.60</u>	<u>.35</u>	<u>.29</u>	<u>.54</u>	.24	.29	.02	.17	<u>.59</u>	<u>.35</u>	-

Correlations significant at $p \leq .001$ are underlined.
Correlations significant at $p \leq .01$ are in bold.
Correlations significant at $p \leq .05$ are in italics.
CU: callous-unemotional.
ADHD: attention deficit hyperactivity disorder.

schools on externalizing symptoms, but not on CU traits and internalizing symptoms. Overall, the patterns of correlations between CU traits and psychopathological symptoms were similar across samples (i.e., specialized high school and other schools).

Discussion

In this study, we aimed to examine the associations between CU traits and a wide set of psychopathological symptoms among adolescent females recruited from high schools and from youth center units/resources. Four noteworthy findings emerged from this study.

First, we found that the participants from the schools had lower scores of CU traits compared to their counterparts recruited from the youth center, which is in line with previous research (27). They also had lower scores of psychopathological symptoms. In addition, as reported in previous studies (12,13,16,18), the total score of CU traits as well as the callousness-uncaring dimension were correlated with a range of variables referring to externalizing problems (e.g., total score of externalizing symptoms, conduct disorder, oppositional defiant disorder, aggression) in both subsamples. The callousness-uncaring dimension was also correlated with the behaviour problems functional impairment scale, showing that for participants from both subsamples, these traits were associated with behaviour difficulties that interfered with their family and peer relationships, school or daily occupations. Additionally, these findings suggest that the French-North American self-report version of the ICU is a valid instrument for the assessment of CU traits in adolescent females.

Second, the current study highlights the importance of considering the background of the participants, as the patterns of associations between CU traits and psychological symptoms differed across sample types. We found that CU

Table 4. Correlations (Pearson's *r*) among CU Traits and Functional Impairment Subscales for Both Subsamples

	CU traits (total score) <i>r</i> (<i>p</i>)	Callousness-uncaring <i>r</i> (<i>p</i>)	Unemotional <i>r</i> (<i>p</i>)
School subsample			
Anxiety	.21 (.010)	.20 (.017)	.11 (.189)
Behaviour problems	.32 (.001)	.35 (.001)	-.01 (.907)
Eating disorders	.09 (.294)	.04 (.609)	.10 (.241)
Depression	.13 (.123)	.05 (.537)	.16 (.057)
Youth center subsample			
Anxiety	-.07 (.628)	-.14 (.342)	.13 (.371)
Behaviour problems	.25 (.077)	.41 (.003)	-.21 (.151)
Eating disorders	-.14 (.344)	-.28 (.053)	.25 (.084)
Depression	-.14 (.324)	-.24 (.089)	.14 (.317)
CU: callous-unemotional.			

traits were associated with externalizing symptoms in both subsamples, but also that they were associated with the total score of internalizing symptoms in the school subsample only. Therefore, this suggests that although CU traits can be strongly associated with externalizing problems, they could also be associated with other psychopathological symptoms in some individuals, notably because of their personal characteristics or family context as well as the possible existence of variants of CU traits (see below). The current findings reinforce the idea that a multiple-outcome approach should be used in research or clinical work to understand further the associations between CU traits and psychopathology. This may be particularly important in females because their adjustment problems may not manifest as externalizing symptoms (20). Moreover, these findings suggest that the ICU could be utilized as an additional tool to assess the functioning of adolescent females from the community (e.g., by school psychologists for students referred because of adjustment problems). The ICU also appears to be useful in clinical settings for the identification of females who may present particularly severe externalizing problems. The assessment of CU traits could provide additional information about the needs of adolescent females and relevant intervention strategies. For instance, adolescent females with CU traits combined with externalizing and internalizing symptoms may need support to address their lack of empathic concerns and difficulty processing emotions as well as their comorbid psychopathology.

Third, as expected and reported in previous research (11,12), we found that the unemotional dimension was not associated with externalizing problems, including conduct

disorder and oppositional defiant disorder. However, unemotional traits were associated with social phobia, depression, and the total score of internalizing symptoms (but not anxiety) especially in the school subsample, suggesting that this dimension may be relevant to the examination of functioning and psychopathological symptoms in adolescent females. We also found weak (and even null with respect to the youth subsample) associations between the callousness-uncaring dimension and the unemotional dimension. Weak to moderate correlations were also reported between the unemotional dimension and the callousness and uncaring traits among adolescent females from the community (14) and from a clinical setting (12). The ICU unemotional scores did not differ across the two subsamples. The current findings, along with previous work, suggest that the unemotional subscale of the ICU may need improvement to better capture the atypical emotional responses that are characteristic of youth with high levels of CU traits. High levels of unemotionality, as currently assessed by the ICU, could be more strongly linked to other expressions of psychopathology, including autism spectrum disorders and depression/anhedonia (28,33). Despite these concerns and based on our findings, this dimension appears to capture (possibly imperfectly), a meaningful construct, that is the propensity for impoverished, shallow and altered emotional experience and expression, which we found to be associated with internalizing symptomatology. Future research is needed to assess further the utility of the total ICU scores. Based on the current findings, it appears that both the callousness-uncaring and the unemotional scales may be useful in the assessment of the functioning of adolescent females.

Fourth, the correlation between CU traits and anxiety was small and non-significant for the school subsample and was negative for the youth center subsample (although it did not reach the statistical level of significance, potentially because of the sample size, see below). In line with our hypothesis, such findings may be explained by the existence of heterogeneous groups of individuals with CU traits. There is increasing empirical support for distinct groups of youth with CU traits based on the presence or absence of high levels of anxiety (23,24). Such evidence is in congruence with theoretical assumptions suggesting the presence of two variants of psychopathy/CU traits, which could be explained by distinct etiologies (34). The primary CU traits variant is characterized by low levels of anxiety. Genetic risk has been particularly associated with this variant (35). The secondary CU traits variant is characterized by high levels of anxiety and could develop following exposure to environmental adversity (e.g., childhood maltreatment, inconsistent and harsh discipline, family conflicts, and violence). Comparable levels of CU traits are often observed among the two variants (23,36), but the secondary CU traits variant can be associated with higher levels of both externalizing and internalizing problems (23,24,37). Still, there is also evidence showing similar levels of externalizing problems across the two variants (although individuals with the primary variant may be particularly prone to use proactive aggression) (25,36,38). Even if high levels of CU traits in females may be particularly explained by exposure to adversity (as compared to genetic risk) (39), the two variants of CU traits may apply to female populations (19,40). Given that CU traits (ICU total score and the callousness-uncaring dimension) tended to be negatively associated with anxiety in adolescent females recruited from the youth center units/resources and that they had higher levels of proactive aggression, we could postulate that a greater proportion of participants with primary CU traits may have composed this subsample. Although individuals with primary CU traits or with secondary CU traits could be part of community-based as well as clinical samples, individuals with primary CU traits may be more likely to be identified in the latter type of samples. Further analyses on the variants of CU traits with the current data are ongoing to address this hypothesis.

Strengths and Limitations

Our findings, based on the French-North American self-report version of the ICU, are in line with previous research suggesting that ICU scores (and more specifically the callous and uncaring traits) are associated with externalizing symptoms in adolescent females from the community as well as from clinical/at-risk samples. The current study also expanded past work by highlighting the importance of

a multiple-outcome approach including a variety of externalizing symptoms as well as internalizing symptoms when examining the associations between CU traits and psychopathology in females. It also underscores that the patterns of associations between CU traits and internalizing symptoms may differ depending on the population under investigation (community versus clinical samples). Limitations must be acknowledged. First, this study relied on self-reports, which may have inflated the magnitude of some of the associations due to shared method variance. Second, the participants may also have underreported undesirable characteristics or behaviours because of social desirability. However, it is worth noting that CU traits might be better assessed during adolescence using self-reports as compared to other informants (e.g., parents) (41). Third, given the small number of participants in the youth center subsample, our capacity to detect significant but weak correlations may have been affected.

Conclusions

This study revealed differences in the patterns of associations between CU traits and psychopathology depending on the subscales of CU traits and the sample types (i.e., school subsample versus youth center subsample). Replications of these findings using larger samples of adolescent females from community and clinical settings will be crucial. Such data may also allow for analyses relying on a person-centered approach, in which variants of CU traits could be further investigated. In addition, longitudinal studies including individuals with diverse characteristics (e.g., gender diversity) are also needed to refine our knowledge on the associations between CU traits and psychopathology.

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Conflict of Interest

The authors have no financial relationships or other ties to disclose.

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