Variants of Psychopathic Traits Follow Distinct Trajectories of Clinical Features Among Children with Conduct Problems

Vincent Bégin[1,2] · Michèle Déry[1,2] · Yann Le Corff[1,3,4]

Abstract

Original definitions of psychopathy suggest the existence of two variants that present with distinct clinical features among antisocial adults, but whether these clinical differences originate early in life or emerge at some point during childhood remains uncertain. We examined if primary and secondary variants follow distinct developmental trajectories of theoretically relevant clinical features among children with conduct problems (CP). Participants were 370 children (40.3% girls) with CP initially aged 8.49 years old in average (s.d. = 0.93). Variants indicators (callous-unemotional [CU] traits and anxiety [ANX]) and clinical features were measured at six yearly assessments. A dual trajectory modelling approach was used to identify groups and group memberships were entered in conditional growth models predicting trajectories of clinical features. Four groups were identified: CP-only, anxious (CP + ANX), primary (CP + CU), and secondary (CP + CU + ANX). Both variants showed higher initial levels of impairment than the CP-only group on most features. Compared to the primary variant, membership to the secondary variant was associated with more stable patterns of CP, oppositional problems, narcissism-grandiosity and impulsivity-irresponsibility traits. Moreover, children from the secondary variant showed higher initial levels of impairment in terms of cognitive abilities, depression, victimization, and dependency to teachers, with non-significant effects on the slope parameters suggesting that these early differences persist across development. In addition to showing distinct clinical features relatively early in childhood, children from the secondary variant of psychopathic traits are at high risk of experiencing an increasing psychopathological burden across childhood. The early identification and treatment of these children therefore appears particularly important.

Keywords Psychopathic traits · Variants · Childhood · Callous-unemotional · Conduct problems

Previous research has highlighted the importance of psychopathic traits (i.e., callous-unemotional, narcissism-grandiosity, impulsivity-irresponsibility traits) in understanding the heterogeneity of conduct problems and early antisocial pathways (Frick et al., 2014; Salekin, 2017). Though the clinical utility of these traits is established in children and adolescents with conduct problems, an accumulating body of evidence suggests that youths with high levels of psychopathic traits do not form a homogeneous group in terms of clinical features and outcomes, but can in fact be divided into primary and secondary *variants* (i.e. profiles), each showing distinct clinical characteristics during adolescence (e.g., Fanti et al., 2013; Kahn et al., 2013). However, only a few studies have been conducted on these variants during childhood (e.g., Humayun et al., 2014; Goulter et al., 2017). Since traits have genetic underpinnings but also exert a reciprocal influence with the social environment as well as with the individual's other personality traits (Krueger & Johnson, 2008; Morizot, 2015; Roberts, 2009; Shiner & Caspi, 2012), some distinctive characteristics (i.e., differences in clinical features) could originate early in life and be already salient in childhood, while others could emerge at some point during childhood. Such knowledge is important for the clinical assessment

✉ Vincent Bégin
vincent.begin@umontreal.ca

1   Groupe de recherche et d'intervention sur les adaptations sociales de l'enfance (GRISE), Université de Sherbrooke, Sherbrooke, Canada

2   Département de psychoéducation, Université de Sherbrooke, Sherbrooke, Canada

3   Département d'orientation professionnelle, Université de Sherbrooke, Sherbrooke, Canada

4   Département de psychiatrie, Université de Sherbrooke, Sherbrooke, Canada

and treatment of children with conduct problems and psychopathic traits, as it is likely to highlight the specific needs of children belonging to the two variants as well as distinct potential intervention targets. Hence, the current study aimed to determine if the two variants of psychopathic traits differ in terms of developmental trajectories of a set of key clinical features assessed from childhood to adolescence in a clinical sample of children with high levels of conduct problems.

Variants of Psychopathic Traits in Youths and Clinical Differences

The hypothesis of the two variants of psychopathy originates in early conceptualizations of psychopathy described by clinicians (Cleckley, 1941; Karpman, 1941, 1948). On one side, Cleckley (1941) described what is now referred to as the primary variant, in which psychopathic traits are thought to be the result of strong constitutional/genetic underpinnings and to manifest in an inability to experience typical emotional arousal. On the other side, Karpman (1941, 1948) described the secondary variant of psychopathy as a subgroup of individuals in which psychopathic traits are thought to develop following early experiences of environmental adversity (i.e., abuse, maltreatment or other traumatic events). Unlike the primary variant, this secondary variant is thought to be characterized by intense psychological distress and emotional reactivity resulting from this early environmental adversity. Following this conceptual distinction, the common method used in research to identify the two variants is to measure psychopathic traits and psychological distress, mostly anxiety levels, as indicators of clusters or latent profiles. Doing so, studies have consistently identified the primary and secondary variants among psychopathic adults, and revealed that those from the secondary variant present with a more severe clinical profile than those from the primary variant (e.g., higher levels of aggression, impulsivity, internalizing and externalizing psychopathology; see, for instance, Hicks et al., 2004; Poythress et al., 2010; Skeem et al., 2007).

The two variants have also been identified in samples of adolescents. Studies conducted among incarcerated (e.g., Kimonis et al., 2013; Zwaanswijk et al., 2018) or clinic-referred samples (e.g., Euler et al., 2015; Kahn et al., 2013) have typically used either the three dimensions of psychopathic traits or the callous-unemotional (CU) dimension only, as well as anxiety levels as variants indicators, while some studies conducted in community-based samples also considered levels of conduct problems as an additional variants indicator (e.g., Fanti et al., 2013). Consistent with studies conducted on psychopathic adults, these studies reported a more severe clinical profile in adolescents from the secondary

variant in terms of behavioral and psychological features, including higher levels of aggression (Fanti et al., 2013), delinquency (Kimonis et al., 2013; Vaughn et al., 2009), narcissism-grandiosity traits (Fanti et al., 2013), negative emotionality, depression (Kimonis et al., 2012), attention-deficit/hyperactivity disorder symptomatology (Cecil et al., 2018), as well as lower self-esteem (Zwaanswijk et al., 2018). Differences in relational and social features have also been reported, with adolescents classified in the secondary variant showing higher levels of criminal victimization (Vaughn et al., 2009), problems with peers (Zwaanswijk et al., 2018) and other social difficulties (e.g., popularity striving; Fanti et al., 2013), and being more likely to show a history of parental maltreatment (Kimonis et al., 2012), than youths classified in the primary variant.

Taken together, these studies indicate that variants of psychopathic traits delineate meaningful subgroups of adolescents showing distinct clinical profiles that resemble those observed among samples of adults. From a theoretical viewpoint, however, as the etiology of the secondary variant of psychopathic traits is posited to be mainly environmental, one could expect the differences between this variant and the primary variant to have emerged at some point during childhood, with the early experiences of adversity that are thought to have contributed to the development of these traits in the secondary variant. Supporting this idea, one study in which the two variants were identified in early adolescence (13 years old) showed that children from the two groups followed distinct developmental trajectories of a set of behavioral clinical features during childhood (e.g., oppositional, conduct, prosociality problems), hence suggesting that the clinical distinctions emerged before adolescence (Meehan et al., 2017).

The few studies conducted among children (Fanti & Kimonis, 2017; Goulter et al., 2017; Huang et al., 2019; Humayun et al., 2014) used community-based samples and also identified the two variants at this developmental period. Importantly, some of these studies suggested that variant membership is stable across childhood, either by reporting that the initial differences in terms of variants indicators were maintained from age 3 to age 15 (Fanti & Kimonis, 2017), or by identifying the two variants using developmental trajectories of CU traits and anxiety from 7 to 15 years of age and reporting stability in these variants indicators over this period (Goulter et al., 2017). These results provided evidence on the validity of this subtyping approach from a developmental perspective.

Among the studies conducted during childhood, only those of Goulter et al. (2017) and Humayun et al. (2014) examined some clinical features concurrently or at least at some point before adolescence. Goulter and colleagues reported that girls classified in the secondary variant showed greater levels of depression, less self-control, and suffered

greater harsh parental punishment assessed at age 7 when compared to girls from the primary variant. For their part, Humayun and colleagues compared the variants identified at age 7 on behavioral and social adjustment problems (conduct problems, hyperactivity, peer problems) and parenting characteristics (parental negative feelings and parental harsh discipline) assessed twice, at ages 4 and 7. Unlike Goulter and colleagues, they reported non-significant differences between variants on parenting characteristics, a result they explained by the relatively low frequencies of high levels of negative parenting characteristics in their community-based sample. Further, these authors reported non-significant differences in adjustment problems at age 4 but observed significantly higher levels of conduct and peer problems at age 7 in children from the secondary variant in comparison to those from the primary variant. These results suggest that differences between variants could increase during childhood and underline the need to assess clinical features longitudinally in the aim of detecting if the gap between variants widens across development.

The Present Study

In addition to the clinical features that have been studied in the body of research reviewed above, a further investigation of the relational characteristics of children from the primary and secondary variants is warranted. For example, very few studies have considered the quality of relationships children develop with their teachers. Given the importance of the school environment during childhood and adolescence, it would be important to determine whether children from the two variants differ in the quality of student–teacher relationships. For instance, the traits and behaviors that are typical to children from the secondary variant may lead to several conflicts at school, and in turn, deteriorate their relationships with their teacher (Mejia & Hoglund, 2016). Also, very little is known on whether differences in clinical features emerge during childhood, and no study has simultaneously modeled trajectories of variants indicators and clinical features, which would be important to accurately capture differences between the two variants from a developmental perspective. Finally, as children with conduct problems are particularly at-risk of presenting with high levels of psychopathic traits (e.g., Kahn et al., 2012) and are most likely to directly benefit from findings on the matter, further investigation in this clinical population is warranted.

Consequently, this study aimed to establish whether stable primary and secondary variants of psychopathic traits differ on developmental trajectories of a set of theoretically relevant behavioral/psychological and relational/social clinical features, all assessed at six yearly time points across childhood. Clinical features were chosen based on

those reported in the previously reviewed literature, with the addition of variables referring to the child-teacher relationship, which were examined on an exploratory basis. Consistent with previous studies (e.g., Fanti & Kimonis, 2017; Goulter et al., 2017; Humayun et al., 2014; Meehan et al., 2017), we expected that children classified in the secondary variant would show greater levels of impairment (higher initial levels and/or more stable patterns) on most behavioral and psychological features, such as conduct, oppositional, depression, attention-deficit, and cognitive problems. With regards to relational and social features, (1) we hypothesized that children from the secondary variant would show greater problems with peers compared to those from the primary variant based on results from previous studies (Fanti et al., 2013; Humayun et al., 2014; Zwaanswijk et al., 2018), (2) no hypotheses were made regarding relations with parents as previous studies reported mixed findings regarding these variables (Goulter et al., 2017; Humayun et al., 2014), and (3) no hypotheses were made regarding relations with teachers since these variables were included on an exploratory basis. For replication purposes of studies conducted among children, the callous-unemotional dimension was selected as variant indicator. However, the two other dimensions of psychopathic traits were included as clinical features in the current study in order to clarify whether the two variants show significantly different trajectories of other psychopathic dimensions.

Method

Participants and Procedure

Participants were 370 children (40.3% girls; mean age at study intake = 8.49, $SD = 0.93$, age range = 6–9) taking part in an ongoing longitudinal study on childhood-onset conduct problems. These children were recruited between 2008 and 2010 in 155 elementary schools located in urban and rural regions of the province of Québec (Canada). All children were identified with the school boards' lists of students referred to school-based psychosocial services for conduct problems. Since children who were referred for these services were mainly boys, parents of all girls less than 10 years of age, and of approximately one out of four boys, were contacted to participate in the study to obtain a sample containing a roughly equal proportion of girls and boys. Participation rate was 75.1% and there were no differences between participants and nonparticipants in terms of sex ratio, grade level or neighborhood deprivation index of schools attended. Most children were born in Canada (98.7%) and 68.5% lived in non-intact families. Family median annual income ($45,000 CAD) was below the 2010 median household income in Canada ($69,860; Statistique Canada, 2016). At the first assessment, mean T scores using the highest T score between

the parent and teacher versions of the DSM-oriented scales of the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001) were of 72.53 for conduct problems ($SD = 8.43$) and 69.92 for oppositional problems ($SD = 6.61$), which is above/close to the clinical cutoff score of this instrument set at $T \geq 70$.

The child, a parent and a teacher were interviewed at six yearly time points (T1 to T6). Informed consent was obtained from all parents and verbal assent from all children, who were met separately at their homes by graduate-level students, at each assessment. Once parental consent was obtained, teachers were contacted and, upon consenting to participate, administered the questionnaires by telephone. The three informants received incentives for each assessment to which they agreed to participate. The University of Sherbrooke research ethics board approved all procedures of the current study. The participation rates for the six yearly assessments were 100%, 93.8%, 92.7%, 90.5%, 90.5%, and 88.1% respectively. Thirty-seven children (10% of the sample) left the study. These children did not differ from those who remained in the study in terms of proportions of boys and girls ($\chi^2(1) = 0.15$, $p = 0.70$) and in their mean levels of the following variables assessed at the first assessment: age ($t(368) = -1.37$, $p = 0.17$), annual family income ($t(368) = 0.60$, $p = 0.92$), conduct problems ($t(368) = -0.48$, $p = 0.65$), CU traits ($t(355) = 0.21$, $p = 0.84$), and anxiety ($t(355) = -0.26$, $p = 0.80$).

Measures

All measures were administered at each of the same six annual assessments. Numbers of valid data, descriptive statistics and reliability indices for all study variables are presented in the online supplementary material (Table S1). Ordinal alphas were used to assess reliability as they provide a more accurate estimation of reliability when using ordinal items (Gadermann et al., 2012).

Variants Indicators

Callous-Unemotional Traits CU traits were assessed by parents and teachers using the French-Canadian translation (Deshaies et al., 2009) of the Psychopathy Screening Device (Frick et al., 1994), the former version of the Antisocial Process Screening Device (Frick & Hare, 2001). As the two contain the same set of items, we used the six-item CU scale of the latter to assess CU traits in this study. Items were scored on a 3-point ordinal scale ranging from 0 (*not at all true*) to 2 (*definitely true*). Parents and teachers' reports were combined in a way that reflects the expected stability of traits across contexts (Roberts, 2009), therefore requiring

an agreement between both informants for a score to be retained. For example, if the parent coded an item "1" and the teacher coded the item "2", a score of "1" was retained as both informants agreed upon this score. This scoring approach is in accordance with the clinical assessment of CU traits recommended in the DSM-5, which states that CU traits must manifest "in multiple relationships and settings" to be considered to be present (American Psychiatric Association, 2013). The validity of the three-factor model of the Antisocial Process Screening Device has been supported in referred samples of children (Dong et al., 2014), and its longitudinal invariance in this sample was established in a previous investigation (Bégin et al., 2019).

Anxiety The six-item DSM-oriented scale for anxiety problems of the ASEBA (Achenbach & Rescorla, 2001) was administered to the parent and the teacher to evaluate levels of anxiety. Items are scored on a 3-point ordinal rating scale ranging from 0 (*not true*) to 2 (*very true or often true*). In the aim of obtaining an anxiety measure that is closer to the child's typical patterns of functioning and fundamental tendencies across contexts (i.e. *trait anxiety*) rather than to the transitory emotional arousal experienced in specific situations (i.e. *state anxiety*) (Bradley, 2016; Endler & Kocovski, 2001), we used the same multi-informant scoring method as for the measure of CU traits. The structural validity of the DSM-oriented scales of the ASEBA was supported in both populational and clinic-referred samples (Price et al., 2013), and the reliability, concurrent validity and predictive validity of the DSM-oriented scale for anxiety problems have been supported among clinic-referred youths (Knepley et al., 2019; Nakamura et al., 2009).

Behavioral/Psychological Variables

Cognitive Abilities Cognitive abilities were estimated using raw scores on the Peabody Picture Vocabulary Test (Dunn et al., 1993). This measure of receptive vocabulary was used as a proxy of cognitive abilities since it has been shown to be a good indicator of cognitive skills (Dunn et al., 1993) and subsequent academic success (Desrosiers et al., 2006).

Conduct Problems, Oppositional Problems, and Depression The assessment of these behavioral/psychological problems was based on parent and teacher reports using scales of the ASEBA (Achenbach & Rescorla, 2001). The DSM-oriented scales for conduct problems include 17 items (parent version) and 13 items (teacher version), the DSM-oriented scales for oppositional problems include 5 items, and the syndrome scales for withdrawal/depression contain 8 items.

Items of the three scales are rated on a 3-point ordinal rating scale ranging from 0 (*not true*) to 2 (*very true or often true*). Since behavioral problems are often context-specific (De Los Reyes et al., 2009), the highest T scores between the two informants following the norms of the instrument were used as variables. This multi-informant scoring approach allowed to assess the full magnitude of the child's difficulties and was shown to yield the best optimization between sensitivity and specificity when assessing such behaviors in youths (Lapalme et al., 2020).

Attention-Deficit/Hyperactivity Problems Parents and teachers completed the Conner's ADHD/DSM-IV Scales (Conners, 2001) to assess attention-deficit/hyperactivity problems. The 18 items of the scales are rated on a 4-point ordinal scale ranging from 0 (*not at all true*) to 3 (*very true*). The highest score between both informants was retained as variable for the same reasons exposed above.

Psychopathic Traits Psychopathic traits other than CU traits were measured using the parent and teacher versions of the narcissism-grandiosity (7 items) and impulsivity-irresponsibility (5 items) scales of the Antisocial Process Screening Device (Frick & Hare, 2001; see the CU traits measure section). Consistent with the scoring approach used for CU traits, each item was coded using an "and" algorithm.

Relational/Social Variables

Parent–Child Relationship The quality of parent–child relationship was assessed by the parents using the four scales of the Parental Acceptance-Rejection Questionnaire (Rohner, 1991; Rohner & Khaleque, 2005): Warmth (20 items), Hostility (15 items), Neglect (15 items), and Rejection (10 items). The items were answered on a 4-point rating scale ranging from 1 (*almost always true*) to 4 (*almost never true*).

Teacher–Child Relationship The Student–Teacher Relationship Scale (Pianta, 2001) is a 28-item teacher-reported scale which measures three dimensions: Closeness (11 items), Conflict (12 items), and Dependency (5 items). All items are rated on a 5-point ordinal scale ranging from 1 (*does not apply to this child*) to 5 (*completely applies to this child*).

Peers-Child Relationship Quality of the relationships with peers was assessed with two scales administered to parents and teachers. The child's *social competence* was assessed using the Teacher Social Competence – Revised scale (Conduct Problems Prevention Research Group, 2004). The scale contains 7 items answered on a 6-point rating scale ranging from 0 (*almost never*) to 5 (*almost

always). *Victimization from peers* was assessed using a reverse version of the Direct and Indirect Aggression Scales (Björkqvist et al., 1992). In the current study, the scale included 16 items on physical, verbal and indirect victimization. Items are rated on a 5-point ordinal scale ranging from 0 (*never*) to 4 (*very often*). For the two scales (social competence and victimization), the highest score between the two informants was retained as variables.

Data Analysis

Analyses were conducted with Mplus 8.1 (Muthén & Muthén, 1998–2018) using full information maximum likelihood to handle missing data. The analytical approach consisted in two steps: (1) identification of variants/clinical groups, and (2) investigation of the associations between group memberships and trajectories of clinical features.

Variants/clinical groups were identified using a dual trajectory modelling approach (Nagin & Tremblay, 2001; Nagin & Odgers, 2010). Accordingly, the developmental trajectories of the two variants indicators were a priori identified separately. Beforehand, we conducted linear and quadratic latent growth models of CU traits and anxiety using the six yearly assessments. Since the inclusion of the quadratic parameter increased the Bayesian Information Criteria (BIC) value for both models, linear models were retained for subsequent analyses. Latent class growth analyses (LCGA) models with 2 to 5 classes were then conducted separately for CU traits and anxiety. Model selection was based on conventional fit indices used to assess model fit in LCGA: lower BIC indicates better fit, non-significant Lo-Mendell-Rubin likelihood test (LMR-LRT) indicates better fit of a model with $k - 1$ class, and entropy value ≥ 0.70 suggests a clear classification of subjects (Wang & Wang, 2012; Nagin & Tremblay, 2005). Parsimony and coherence with theories and empirical studies of the field were also considered. Once the best fitting models were selected, a dual trajectory model with fixed number of classes for both constructs was conducted, thus allowing to estimate the posterior joint probabilities of membership to trajectories of the two constructs simultaneously. Children were assigned to their most likely joint class membership to create the variants/clinical groups.

The associations between group memberships and trajectories of clinical features were examined using membership to the variants/clinical groups obtained in the previous step as predictors of the mean latent trajectory of behavioral/psychological and relational/social variables. For each variable, linear and quadratic

unconditional growth models using the six yearly assessments were first conducted. Since the BIC increased when the quadratic term was specified in most models, linear growth models were retained as more accurate depictions of trajectories of clinical features (with the exception of the cognitive abilities and attention-deficit/hyperactivity problems models, in which the BIC decreased; in these cases, a quadratic growth shape was retained). Following this step, a conditional growth model was conducted using the joint class memberships as predictors of the growth parameters (intercept and slope for linear models; intercept, slope and quadratic term for quadratic models) for each behavioral/psychological and relational/social variable. Each joint class memberships were dichotomized and entered simultaneously (except for the reference category) in the conditional growth models. All models were conducted three times with a different reference category in order to analyze all pairwise contrasts. Adequacy of model fit of all unconditional and conditional growth models were based on previously reported guidelines according to which Root mean square error of approximation (RMSEA) values smaller than 0.06, Comparative fit indexes (CFI) greater than 0.95, and Tucker-Lewis Indexes (TLI) greater than 0.95, are indicative of good model fit (Hu & Bentler, 1999) and RMSEA values between 0.06 and 0.08, CFI values between 0.90 and 0.95, and TLI values between 0.90 and 0.95, are indicative of acceptable model fit (Marsh et al., 2005).

Results

Identifying Variants with Callous-Unemotional Traits and Anxiety Trajectories

Trajectories of the two retained LCGA models (CU traits and anxiety), as well as fit indices for all tested models, are presented in Fig. 1. A model with two trajectory classes was selected for CU traits. Although the BIC slightly decreased from the 2- to 5-trajectory models, the LMR-LRT rejected models with 3 to 5 classes and pointed to the two-trajectory model as presenting a better fit. The entropy was also satisfying in the two-trajectory model (0.75), while it was under the minimally acceptable value of 0.70 for the other models. More than half of the children (54.86%) followed a higher and stable CU traits trajectory (labelled *higher*; intercept $= 4.04$, $p < 0.05$; slope $= 0.04$, $p = 0.22$), while less than the other half (45.14%) followed a lower and stable CU traits trajectory (labelled *lower*; intercept $= 2.07$, $p < 0.05$; slope $= -0.05$, $p = 0.12$). A model with two trajectory classes was also selected for anxiety. Here again, the BIC steadily decreased from the 2- to 5-trajectory models, but the LMR-LRT rejected models with 3 to 5 classes and suggested the two-trajectory model had the best fit to the data. This model was also the one with the highest entropy value (0.88). Close to one fourth of the children (22.43%) followed a higher and stable anxiety trajectory (labelled *higher*; intercept $= 4.23$, $p < 0.05$; slope $= -0.08$, $p = 0.26$) while the others (77.57%) followed a lower and decreasing
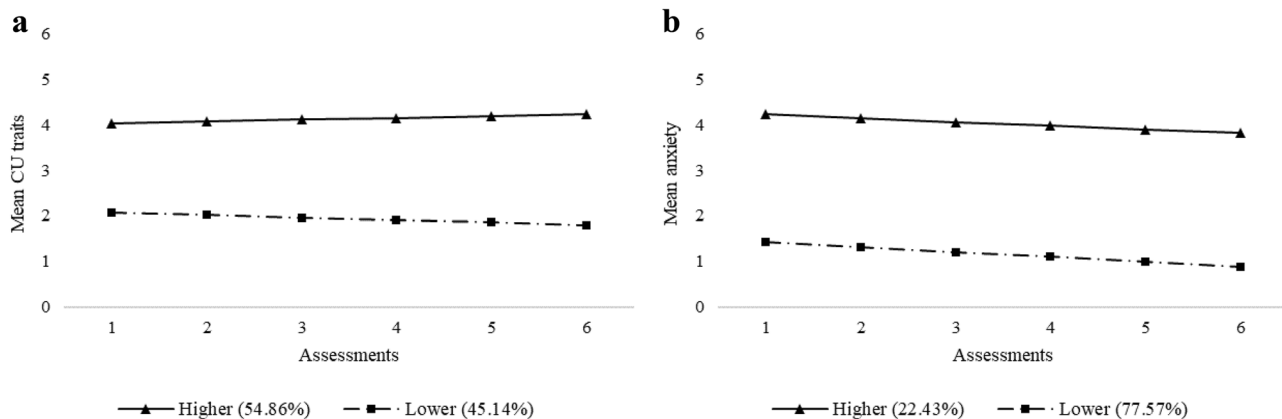

Fig. 1 Developmental trajectories of callous-unemotional (CU) traits **a** and anxiety **b**. Developmental trajectories of callous-unemotional (CU) traits **a** and anxiety **b**. Fit indices of the 2-trajectory model of CU traits: Bayesian Information Criteria (BIC) = 7260.31, Lo-Mendell Rubin likelihood test (LMR-LRT): $p < .01$, entropy = .75. Fit indices of the 3-trajectory model of CU traits: BIC = 7240.61, LMR-LRT: $p = .08$, entropy = .67. Fit indices of the 4-trajectory model of CU traits: BIC = 7236.38, LMR-LRT: $p = .13$, entropy = .64. Fit indices of the 5-trajectory model of CU traits: BIC = 7237.51, LMR-LRT: $p = .52$, entropy = .61. Fit indices of the 2-trajectory model of anxiety: BIC = 7351.41, LMR-LRT: $p < .01$, entropy = .88. Fit indices of the 3-trajectory model of anxiety: BIC = 7230.44, LMR-LRT: $p = .05$, entropy = .84. Fit indices of the 4-trajectory model of anxiety: BIC = 7161.75, LMR-LRT: $p = .05$, entropy = .85. Fit indices of the 5-trajectory model of anxiety: BIC = 7158.08, LMR-LRT: $p = .33$, entropy = .82

anxiety trajectory (labelled *lower*; intercept = 1.44, $p < 0.05$; slope = -0.11, $p < 0.05$).

The dual trajectory model with number of classes specified at 2 for the two trajectory class variables produced clear classification of participants across the four latent class variable patterns (entropy value = 0.81). After assigning all children to their most likely joint class membership, the following four groups were obtained: children following the *lower* CU traits trajectory and the *lower* anxiety trajectory (group labelled *CP-only*; n = 131 [35.41% of the sample], 44.30% girls), children following the *lower* CU traits trajectory and the *higher* anxiety trajectory (group labelled *anxious*; n = 36 [9.73% of the sample], 30.60% girls), children following the *higher* trajectory of CU traits and the *lower* trajectory of anxiety (group labelled *primary*; n = 156 [42.16% of the sample], 39.70% girls), and children following the *higher* trajectory of CU traits and the *higher* trajectory of anxiety (group labelled *secondary*; n = 47 [12.70% of the sample], 38.30% girls). The four groups were consistent with findings from previous studies conducted on variants of psychopathic traits (e.g., Fanti et al., 2013; Goulter et al., 2017) and did not statistically differ in terms of proportions of boys and girls ($\chi^2(3) = 2.38$, $p = 0.50$), mean age at the first assessment ($F(3, 366) = 0.89$, $p = 0.45$), and mean annual family income at the first assessment ($F(3, 363) = 1.32$, $p = 0.27$).

Groups Memberships and Trajectories of Behavioral/Psychological Variables

All unconditional growth models showed satisfying fit to the data (RMSEAs range = 0.00 – 0.05; CFIs range = 0.98 – 1.00; TLIs range = 0.98 – 1.00). Most variables showed a significantly ($p < 0.01$) declining trajectory over the six annual assessments except for cognitive abilities, which was expected to follow a significantly increasing pattern since raw scores of the instrument were used. Growth parameters and fit indices of all unconditional growth models are presented in the online supplementary material.

Table 1 shows results of the conditional growth models predicting trajectories of behavioral/psychological variables from groups memberships. All models showed satisfying fit to the data (RMSEAs range = 0.00 – 0.04; CFIs range = 0.97 – 1.00; TLIs range = 0.96 – 1.01). As shown in Table 1, membership to the two psychopathic traits variants was associated with significantly higher initial levels of impairment on all variables in comparison to the CP-only group. In addition, membership to the secondary variant was associated with significantly less declining patterns of conduct problems, oppositional problems, and impulsivity-irresponsibility traits when compared to membership to the CP-only group. In comparison to the anxious group, membership to the primary variant was associated higher initial levels of conduct problems, while membership to the secondary variant was associated with higher initial levels of conduct problems and narcissism-grandiosity traits, as well as to a less declining pattern of oppositional problems.

When comparing membership to the primary variant with membership to the secondary variant, results showed that being in the secondary variant was related to a significantly lower initial level of cognitive abilities and higher initial level of depression. Further, the non-significant effects on the slope parameters of these two variables suggest that the initial differences did not mitigate through childhood. Inversely, membership to the secondary variant was not significantly related to initial levels of conduct problems, oppositional problems, narcissism-grandiosity and impulsivity-irresponsibility traits when compared to membership to the primary variant, but was related to less declining patterns of these variables. In comparison to the primary variant, membership to the secondary variant was unrelated to the intercept or slope parameters of attention-deficit/hyperactivity disorder problems, indicating similar initial levels and developmental course of these difficulties between the two groups.

Groups Memberships and Trajectories of Relational/Social Variables

All unconditional growth models showed satisfying fit to the data (RMSEAs range = 0.00 – 0.08; CFIs range = 0.91 – 1.00; TLIs range = 0.92 – 1.03). Most relational/social variables showed a significantly ($p < 0.01$) declining mean trajectory. The mean trajectory of parental warmth was stable and the mean trajectory of social competence with peers was significantly increasing. Growth parameters and fit indices of all unconditional growth models are presented in the online supplementary material.

The conditional growth models predicting trajectories of relational/social variables from groups memberships (Table 2) showed adequate fit to the data (RMSEAs range = 0.00 – 0.06; CFIs range = 0.92 – 1.00; TLIs range = 0.90 – 1.04). Memberships to the primary and secondary variants were associated with higher initial levels of impairment on most variables when compared to membership to the CP only group: Children from the two variants experienced lower levels of warmth and higher levels of hostility, neglect, and rejection from their parents, showed higher levels of conflict and dependency with their teachers, and presented lower levels of social competence with peers. Further, membership to the secondary, but not the primary, variant was associated with higher initial levels of victimization from peers in comparison to the CP only group. When compared to the anxious group, membership to the two variants was associated with lower initial levels of closeness to teachers. Also in comparison to

Table 1 Conditional growth models predicting trajectories of behavioral/psychological variables from group memberships

Variables	Prediction of intercept β (s.e.)						Prediction of slope β (s.e.)					
	Anx VS CP-only	Prim VS CP-only	Sec VS CP-only	Prim VS Anx	Sec VS Anx	Sec VS Prim	Anx VS CP-only	Prim VS CP-only	Sec VS CP-only	Prim VS Anx	Sec VS Anx	Sec VS Prim
Cognitive abilities	**-0.12 (0.06)**	**-0.19 (0.06)**	**-0.27 (0.06)**	0.01 (0.09)	-0.14 (0.08)	**-0.14 (0.06)**	0.04 (0.14)	-0.03 (0.15)	-0.07 (0.14)	0.10 (0.22)	-0.12 (0.18)	-0.05 (0.14)
Conduct problems	0.11 (0.07)	**0.41 (0.07)**	**0.32 (0.07)**	**0.23 (0.11)**	**0.20 (0.09)**	0.04 (0.07)	0.09 (0.10)	0.10 (0.10)	**0.30 (0.10)**	-0.05 (0.16)	0.20 (0.13)	**0.23 (0.10)**
Oppositional problems	**0.23 (0.06)**	**0.26 (0.07)**	**0.30 (0.06)**	-0.12 (0.11)	0.03 (0.09)	0.12 (0.07)	0.00 (0.09)	0.12 (0.09)	**0.31 (0.09)**	0.12 (0.15)	**0.31 (0.12)**	**0.23 (0.09)**
Depression problems	**0.22 (0.06)**	**0.20 (0.06)**	**0.40 (0.06)**	-0.16 (0.10)	0.16 (0.08)	**0.26 (0.06)**	0.03 (0.09)	0.05 (0.10)	0.11 (0.09)	-0.01 (0.15)	0.07 (0.12)	0.08 (0.09)
Attention-deficit problems	**0.28 (0.07)**	**0.27 (0.07)**	**0.27 (0.07)**	-0.19 (0.11)	-0.05 (0.09)	0.08 (0.07)	0.13 (0.13)	0.09 (0.13)	0.12 (0.13)	-0.12 (0.21)	-0.02 (0.16)	0.06 (0.13)
Narcissism-grandiosity	0.05 (0.07)	**0.25 (0.08)**	**0.27 (0.07)**	0.17 (0.12)	**0.21 (0.10)**	0.10 (0.07)	0.04 (0.11)	-0.03 (0.11)	0.20 (0.11)	-0.10 (0.18)	0.16 (0.14)	**0.22 (0.11)**
Impulsivity-irresponsibility	0.13 (0.08)	**0.39 (0.08)**	**0.31 (0.08)**	0.16 (0.12)	0.16 (0.10)	0.05 (0.08)	0.10 (0.12)	-0.03 (0.13)	**0.28 (0.12)**	-0.20 (0.19)	0.17 (0.15)	**0.30 (0.12)**

Values in bold denote significance at the $p < .05$ level. Conditional growth models were conducted separately for each outcome. Membership to the variants/clinical groups were coded as four dichotomic variables and three were entered in the model simultaneously (three times for each model, each time changing the reference category in order to examine all pairwise comparisons). No significant associations were found between groups memberships and the quadratic parameter of the two quadratic growth models (cognitive abilities and attention-deficit problems). β: standardized beta coefficient; s.e.: standard error of the standardized beta coefficient; CP-only: conduct problems only group; Anx.: anxious group; Prim.: primary variant group; Sec.: secondary variant group; Fit indices of all conditional growth models were as follows: Cognitive abilities model: Root mean square error of approximation (RMSEA) = 0.00, Comparative fit index (CFI) = 1.00, Tucker-Lewis Index (TLI) = 1.00. Conduct problems model: RMSEA = 0.04, CFI = 0.98, TLI = 0.98. Oppositional problems model: RMSEA = 0.04, CFI = 0.98, TLI = 0.98. Depression problems model: RMSEA = 0.04, CFI = 0.98, TLI = 0.97. Attention deficit problems model: RMSEA = 0.00, CFI = 1.00, TLI = 1.00. Narcissism-grandiosity model: RMSEA = 0.04, CFI = 0.97, TLI = 0.96. Impulsivity-irresponsibility model: RMSEA = 0.03, CFI = 0.97, TLI = 0.97

Table 2 Conditional growth models predicting trajectories of relational/social variables from groups memberships

Variables	Prediction of intercept β (s.e.)						Prediction of slope β (s.e.)					
	Anx VS CP-only	Prim VS CP-only	Sec VS CP-only	Prim VS Anx	Sec VS Anx	Sec VS Prim	Anx VS CP-only	Prim VS CP-only	Sec VS CP-only	Prim VS Anx	Sec VS Anx	Sec VS Prim
P – Warmth	-0.03 (0.06)	**-0.24 (0.07)**	**-0.15 (0.06)**	-0.19 (0.10)	-0.12 (0.08)	0.01 (0.06)	-0.01 (0.08)	-0.16 (0.09)	-0.06 (0.08)	-0.14 (0.13)	-0.05 (0.11)	0.05 (0.08)
P – Hostility	0.05 (0.06)	**0.16 (0.06)**	**0.20 (0.06)**	0.08 (0.10)	0.15 (0.08)	0.09 (0.06)	0.09 (0.08)	0.14 (0.09)	0.09 (0.08)	-0.01 (0.13)	-0.01 (0.11)	-0.00 (0.08)
P – Neglect	0.05 (0.07)	**0.15 (0.07)**	**0.16 (0.07)**	0.06 (0.11)	0.10 (0.09)	0.06 (0.06)	0.03 (0.09)	0.18 (0.09)	-0.06 (0.09)	0.13 (0.14)	-0.09 (0.11)	**-0.18 (0.08)**
P – Rejection	0.05 (0.06)	**0.15 (0.07)**	**0.17 (0.06)**	0.07 (0.10)	0.11 (0.08)	0.07 (0.06)	-0.03 (0.09)	0.02 (0.09)	0.08 (0.09)	0.07 (0.14)	0.12 (0.12)	0.07 (0.09)
T – Conflict	0.07 (0.08)	**0.23 (0.09)**	**0.31 (0.08)**	0.11 (0.13)	**0.23 (0.11)**	0.15 (0.08)	0.05 (0.13)	0.06 (0.14)	0.11 (0.13)	-0.02 (0.21)	0.05 (0.17)	0.06 (0.13)
T – Closeness	**0.24 (0.09)**	-0.14 (0.10)	-0.13 (0.09)	**-0.53 (0.15)**	**-0.39 (0.12)**	-0.03 (0.09)	**-0.36 (0.03)**	-0.34 (0.18)	0.09 (0.15)	0.26 (0.25)	**0.49 (0.22)**	0.31 (0.16)
T – Dependency	**0.38 (0.09)**	**0.19 (0.09)**	**0.44 (0.09)**	**-0.44 (0.15)**	0.01 (0.12)	**0.31 (0.09)**	-0.33 (0.17)	-0.17 (0.17)	0.04 (0.15)	0.37 (0.26)	0.41 (0.22)	0.16 (0.16)
Pe – Social Competence	**-0.23 (0.06)**	**-0.57 (0.06)**	**-0.41 (0.06)**	-0.18 (0.10)	**-0.16 (0.08)**	-0.04 (0.06)	0.07 (0.09)	-0.05 (0.09)	-0.09 (0.09)	-0.17 (0.15)	-0.17 (0.12)	-0.05 (0.09)
Pe – Victimization	0.12 (0.07)	0.11 (0.07)	**0.30 (0.07)**	-0.10 (0.11)	0.16 (0.09)	**0.23 (0.07)**	**0.19 (0.09)**	0.18 (0.10)	0.12 (0.09)	-0.14 (0.15)	-0.10 (0.12)	-0.01 (0.09)

Values in bold denote significance at the $p < .05$ level. Conditional growth models were conducted separately for each outcome. Membership to the variants/clinical groups were coded as four dichotomic variables and three were entered in the model simultaneously (three times for each model, each time changing the reference category in order to examine all pairwise comparisons. β: standardized beta coefficient; s.e.: standard error of the standardized beta coefficient; CP-only: conduct problems only group; Anx.: anxious group; Prim.: primary variant group; Sec.: secondary variant group; P: parents; T: teachers; Pe: peers; Fit indices of all conditional growth models were as follows: P – Warmth model: RMSEA = 0.06, Comparative fit index (CFI) = 0.97, Tucker-Lewis Index (TLI) = 0.96. P – Hostility model: RMSEA = 0.03, CFI = 0.99, TLI = 0.99. P – Neglect model: RMSEA = 0.00, CFI = 1.00, TLI = 1.01. P – Rejection model: RMSEA = 0.04, CFI = 0.99, TLI = 0.98. T – Conflict model: RMSEA = 0.00, CFI = 1.00, TLI = 1.04. T – Closeness model: RMSEA = 0.00, CFI = 0.99, TLI = 0.90. T – Dependency model: RMSEA = 0.00, CFI = 1.00, TLI = 1.02. Pe – Victimization: RMSEA = 0.03, CFI = 0.99, TLI = 0.99. Pe – Social Competence model: RMSEA = 0.06, CFI = 0.95, TLI = 0.95

the anxious group, membership to the primary variant was associated with lower initial levels of dependency to teachers, and membership to the secondary variant was associated with higher initial levels of conflict with teachers, lower initial levels of social competence and with a less declining trajectory of closeness to teachers.

Comparisons between membership to the primary and secondary variants revealed that children classified in the secondary variant showed higher initial levels of dependency to teachers and victimization from peers, with non-significant effects on the slope parameters suggesting that these differences persist across time. There were no other significant associations between membership to the secondary (compared to primary) variant and initial levels of relational variables. One significant association was however observed on the slope parameter of the trajectory of parental neglect, indicating that membership to the secondary variant was associated with a more rapidly declining pattern of parental neglect over time when compared to membership to the primary variant.

Discussion

Three key findings emerged from this study. First, using developmental trajectories of CU traits and anxiety levels, the expected primary and secondary variants could be identified longitudinally in this sample of children presenting with conduct problems. Second, as hypothesized, the primary and secondary variants differed on a set of behavioral and psychological features. Some differences in psychological clinical features appeared to be already observable in childhood, while other differences related to antisocial behaviors and psychopathic traits gradually increased across childhood. Third, while there were few differences on the parent–child relationship variables between the two variants, children belonging to the secondary variant were more likely to develop lasting teacher–child relationships of dependency and appeared to experience more victimization from peers over time.

Identification of the Two Variants in Children with Conduct Problems

This study first showed that the two variants of CU traits that have previously been reported in community-based samples of children (Fanti & Kimonis, 2017; Goulter et al., 2017; Huang et al., 2019; Humayun et al., 2014) can also be identified among children presenting with high levels of conduct problems that led to service referrals. In this population, a primary variant, which encompasses children who consistently show higher levels of CU traits and lower levels of

anxiety across childhood, and a secondary variant, in which children consistently present with higher levels of both CU traits and anxiety, can be identified. Consistent with results from the previous study that used developmental trajectories of variants indicators to identify the two variants (Goulter et al., 2017), our study showed that the two indicators are stable across childhood, which supports this classification approach from a developmental perspective.

This approach also appears to be clinically relevant in subtyping children showing high levels of conduct problems. Indeed, children from the two variants, which both show high-stable levels of CU traits, appeared to be more impaired than the CP-only group on practically all behavioral/psychological and relational/social variables investigated, which is in line with the large body of evidence accumulated on the clinical usefulness of CU traits over the last years (Frick et al., 2014). Children from the secondary variant also showed differences with children from the anxious group that were not observed between children from the primary variant and from the anxious group. At the behavioral and psychological levels, children from the secondary variant showed higher initial levels of narcissism-grandiosity traits and more stable patterns of oppositional problems than those in the anxious group. At the relational and social levels, children from the secondary variant showed higher initial levels of conflict with teachers, lower initial levels of social competence, and a more stable pattern of closeness to teachers in comparison to anxious children. Since these differences were not observed between the primary and the anxious groups, these results highlight the potential interactive effects between cooccurring stable-high levels of both CU traits and anxiety.

Differences Between Variants on Behavioral and Psychological Features

Consistent with prior studies conducted among samples of children (Goulter et al., 2017; Humayun et al., 2014), our results supported our hypotheses according to which children from the secondary variant would show greater levels of impairment than those from the primary variant, and that the difference between the two in levels of conduct problems would increase across childhood. Our study also sheds light on the emergence of clinical differences between the two variants. For example, the secondary variant appeared initially more impaired that the primary variant in terms of cognitive abilities, and also showed greater initial levels of depression (which could be expected given high comorbidity rates of depression with anxiety), but did not differ from one another in these features' developmental course. These results suggest that children from the secondary variant do not "catch up" to those from the primary variant during childhood, and that these differences can be expected to

be maintained across this period. Inversely, children from the two variants showed similar levels of behavioral difficulties (conduct problems and oppositional problems) as well as other psychopathic traits (narcissism-grandiosity and impulsivity-irresponsibility) at study intake, but those from the secondary variant showed less declining patterns of these clinical features across childhood. These results suggest that the gap between children from the two variants can be expected to widen across childhood, with significant differences showing up in late childhood or early adolescence.

Two complementary explanations might help understand these results. On the one hand, in accordance with a pathoplasticity/exacerbation conception of the relation between personality traits and behaviors (Morizot, 2015), the stability of high levels of both CU and anxiety traits across childhood could exert a continuous influence on the child's behaviors and contribute to the persistence of his/her conduct and oppositional problems. On the other hand, as cumulating high levels of more than one dimension of psychopathic traits has been shown to be a better indicator of later antisocial behaviors than presenting only one elevated dimension of psychopathic traits (e.g., Bégin et al., 2020; Fanti et al., 2018), the more stable patterns of narcissism-grandiosity and impulsivity-irresponsibility traits that characterize children form the secondary variant could partly explain the persistence of these children's behavioral difficulties across childhood.

Differences Between Variants on Relational and Social Features

Consistent with our main study hypothesis, we observed some differences between the two variants in relational and social features. First, the two variants did not differ from each other in their initial levels of the quality of the parent–child relationship, nor in mean levels of change in warmth, hostility and rejection across childhood. These results suggest that the early experiences of adversity that have been reported to characterize the secondary variant, such as traumatic experiences (Euler et al., 2015) and maltreatment (Kimonis et al., 2012), do not lead to an even more deteriorated quality of parent–child relationship than that of children from the primary variant. In fact, children from both variants appear to show particularly poor relationships with their parents as compared to the CP-only group. In support to this assertion and to our result showing that children from the secondary variant experienced a more rapidly declining pattern of parental neglect, Kimonis et al. (2013) found that the two variants differed from each other in the types of maltreatment they suffered. In their study, these authors observed that youths in the primary variant experienced higher levels of emotional and physical neglect, while youths in the secondary variant showed higher scores of sexual abuse in childhood. While our study design did not allow to measure these early experiences of adversity, our results tend to show that the quality of the parent–child relationship is similarly poor in both variants and does not discriminate children from the two.

Second, regarding the differences in the quality of the relationship with their teacher (conflict, closeness, dependency), our study showed no differences between the two variants in initial levels of conflict and closeness, and no differences in the mean level of change over time of the three subscales. However, children from the secondary variant were initially more dependent to their teachers, which could be partly explained by their stable high levels of anxiety through childhood. As these children also showed higher initial levels of victimization by their peers than children from the primary variant, it could be hypothesized that the high anxiety that characterizes them hampers their social adaptation at school, leading them to be excessively reliant on their teacher. Since student–teacher dependency has been linked with numerous behavioral and academic problems (see Roorda et al., 2020 for a meta-analysis), this relationship could, in turn, contribute to the severe clinical profile of children from the secondary variant that we observed in our study. In addition, as our study showed no differences between variants in mean levels of change in victimization over time, it is possible that the continuous victimization experienced by children from the secondary variant contributes to their more stable patterns of behavioral difficulties across childhood. Similarly, since traits from the secondary variant are thought to have strong receptivity to environmental influences (Karpman, 1948), and have been argued to serve as a coping mechanism in these children (Porter, 1996), the victimization experienced by these children could contribute to maintain their levels of other psychopathic traits elevated across this period. It is also possible, however, that showing high levels of psychopathic traits and anxiety increases the risk of continuous victimization across childhood. It should be noted that these explanations are hypothetical and should be further addressed by studies allowing for causal inferences and confirmation of the direction of effects, which was note the case in this study. In sum, our results extend previous findings on the differences between the two variants in childhood by showing that the numerous difficulties and challenges that face children from the secondary variant are likely to broaden beyond the individual and family levels and also impact their relationships with teachers and peers, hence contributing to their particularly severe and complex clinical profile.

Strengths, Limitations and Clinical Implications

This study has several strengths that contribute to its scientific and clinical relevance, including the multi-informant approach used to assess most constructs, the longitudinal design covering a five-year period, and the inclusion of a broad range of clinical features. Some limitations must also be acknowledged. First, since our sample of children was followed from age 8 on average, it was not possible to target the period of emergence of some clinical features, nor to measure early risk-factors that could have distinguished the two variants (e.g., early experiences of abuse or neglect). Second, the reliability of the impulsivity-irresponsibility scale was lower at some assessment points, as it also has been reported in other studies that used this instrument (e.g., Barry et al., 2008; Bergstrom & Farrington, 2018). However, due to the nature of the analytic plan of the study, in which all constructs were modeled as trajectories over time, this lower reliability is very unlikely to have significantly influenced the results. Third, as we aimed to assess differences between the two variants in a broad range of clinical features, multiple statistical models had to be computed, which increased the probability of type I error. Fourth, while the study design offers a valuable insight on differences between the two variants, the same six assessment time points were used for all constructs, and no causal inferences can be drawn from this study.

In conclusion, our results indicate that the psychological profile of children from the secondary variant gradually worsens during childhood and that an early intervention is essential to prevent their situation to deteriorate. In order to maximize the potential effects of their intervention with these children, clinicians should target the clinical features that originate earlier in childhood, such as the lower cognitive abilities and higher psychological distress (both anxiety and depression levels). As these clinical features could contribute to other enduring difficulties, an early intervention on these outcomes could be particularly beneficial on the long run for children in the secondary variant. Moreover, as our results highlighted specific social needs in children from the secondary variant, an intervention component aiming to enhance the student–teacher relationship, as well as to increase the child's integration among his/her peers, appears important.

Compliance with Ethical Standards

References

Achenbach, T.M., & Rescorla, L.A. (2001). *Manual for the ASEBA School-Age Forms and Profiles*. University of Vermont Research Center for Children, Youth, & Families.

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5th ed*. American Psychiatric Publishing.

Barry, T. D., Barry, C. T., Deming, A. M., & Lochman, J. E. (2008). Stability of Psychopathic Characteristics in Childhood: The Influence of Social Relationships. *Criminal Justice and Behavior, 35*(2), 244–262. https://doi.org/10.1177/0093854807310508.

Bégin, V., Déry, M., & Le Corff, Y. (2019). Continuity and Change in Psychopathic Traits Among School-Aged Children with Conduct Problems. *Child Psychiatry and Human Development, 50,* 580–590. https://doi.org/10.1007/s10578-018-00864-3.

Bégin, V., Déry, M., & Le Corff, Y. (2020). Developmental Associations Between Psychopathic Traits and Childhood-Onset Conduct Problems. *Journal of Psychopathology and Behavioral Assessment, 42*(2), 191–202. https://doi.org/10.1007/s10862-019-09779-2.

Bergstrom, H., & Farrington, D. P. (2018). Grandiose-Manipulative, Callous-Unemotional, and Daring-Impulsive: The Prediction of Psychopathic Traits in Adolescence and their Outcomes in Adulthood. *Journal of Psychopathology and Behavioral Assessment, 40*(2), 149–158. https://doi.org/10.1007/s10862-018-9674-6.

Björkqvist, K., Lagerspetz, K. M. J., & Östermann, K. (1992). *Direct and indirect aggression scales*. Department of social sciences: Abo Akademi University.

Bradley, A. (2016). *Trait and State Anxiety: Assessment*. Predictors and Outcomes: Nova Science Pub Inc.

Cecil, C. A. M., McCrory, E. J., Barker, E. D., Guiney, J., & Viding, E. (2018). Characterising Youth with Callous-Unemotional Traits and Concurrent Anxiety: Evidence for a High-Risk Clinical Group. *European Child & Adolescent Psychiatry, 27*(7), 885–898. https://doi.org/10.1007/s00787-017-1086-8.

Cleckley, H. (1941). *The Mask of Sanity: An Attempt to Reinterpret the So-Called Psychopathic Personality*. Mosby Company.

Conduct Problems Prevention Research Group. (2004). *Teacher–Social Competence Scale*. Available from http://www.fasttrackproject.org.

Conners, C.K. (2001). *Conners' Rating Scales-Revised: Instruments for Use with Children and Adolescents*. Multi-Health Systems.

De Los Reyes, A., Henry, D. B., Tolan, P. H., & Wakschlag, L. S. (2009). Linking Informant Discrepancies to Observed Variations in Young Children's Disruptive Behavior. *Journal of Abnormal Child Psychology, 37*(5), 637–652. https://doi.org/10.1007/s10802-009-9307-3.

Deshaies, C., Toupin, J., & Déry, M. (2009). Validation de l'échelle d'évaluation des traits antisociaux. *Canadian Journal of Behavioral Science, 41*(1), 45–50. https://doi.org/10.1037/a0013565.

Desrosiers, H., Ducharme, A., & Institut de la statistique du Québec (2006). *Commencer l'école du bon pied: Facteurs associés à l'acquisition du vocabulaire à la fin de la maternelle*. Institut de la statistique du Québec.

Dong, L., Wu, H., & Waldman, I. D. (2014). Measurement and Structural Invariance of the Antisocial Process Screening Device. *Psychological Assessment, 26*(2), 598–608. https://doi.org/10.1037/a0035139.

Dunn, L.M., Dunn, L.M., & Theriault-Whalen, C. (1993). *Échelle de vocabulaire en images peabody.* Pearson Canada Assessment Inc.

Endler, N. S., & Kocovski, N. L. (2001). State and Trait Anxiety Revisited. *Anxiety Disorders, 15*(3), 231–245. https://doi.org/10.1016/s0887-6185(01)00060-3.

Euler, F., Jenkel, N., Stadler, C., Schmeck, K., Fegert, J. M., Kölch, M., & Schmid, M. (2015). Variants of Girls and Boys with Conduct Disorder: Anxiety Symptoms and Callous-Unemotional Traits. *Journal of Abnormal Child Psychology, 43*(4), 773–785. https://doi.org/10.1007/s10802-014-9946-x.

Fanti, K. A., Demetriou, C. A., & Kimonis, E. R. (2013). Variants of Callous-Unemotional Conduct Problems in a Community Sample of Adolescents. *Journal of Youth and Adolescence, 42*(7), 964–979. https://doi.org/10.1007/s10964-013-9958-9.

Fanti, K. A., & Kimonis, E. R. (2017). Heterogeneity in Externalizing Problems at Age 3: Association with Age 15 Biological and Environmental Outcomes. *Developmental Psychology, 53*(7), 1230–1241. https://doi.org/10.1037/dev0000317.

Fanti, K. A., Kyranides, M. N., Lorsdos, A., & Colins, O. F. (2018). Unique and Interactive Associations of Callous-Unemotional Traits, Impulsivity, and Grandiosity with Child and Adolescent Conduct Disorder Symptoms. *Journal of Psychopathology and Behavioral Assessment, 40*(1), 40–49. https://doi.org/10.1007/s10862-018-9655-9.

Frick P.J., & Hare, R.D. (2001). *The Antisocial Process Screening Device*. Multi-Health Systems.

Frick, P. J., O'Brien, B. S., Wootton, J. M., & McBurnett, K. (1994). Psychopathy and Conduct Problems in Children. *Journal of Abnormal Psychology, 103*(4), 700–707. https://doi.org/10.1037//0021-843x.103.4.700.

Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014). Can Callous-Unemotional Traits Enhance the Understanding, Diagnosis, and Treatment of Serious Conduct Problems I Children and Adolescents? *A Comprehensive Review. Psychological Bulletin, 140*(1), 1–57. https://doi.org/10.1037/a0033076.

Gaderman, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating Ordinal Reliability for Likert-Type and Ordinal Item Response Data: A Conceptual, Empirical, and Practical Guide. *Practical Assessment, Research, and Evaluation, 17*(3), 2–13. https://doi.org/10.7275/n560-j767.

Goulter, N., Kimonis, E. R., Hawes, S. W., Stepp, S., & Hipwell, A. E. (2017). Identifying Stable Variants of Callous-Unemotional Traits: A Longitudinal Study of At-Risk Girls. *Developmental Psychology, 53*(12), 2364–2376. https://doi.org/10.1037/dev0000394.

Hicks, B. M., Markon, K. E., Patrick, C. J., Krueger, R. F., & Newman, J. P. (2004). Identifying Psychopathy Subtypes on the Basis of Personality Structure. *Psychological Assessment, 16*(3), 276–288. https://doi.org/10.1037/1040-3590.16.3.276.

Hu, L., & Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118.

Huang, J., Fan, L., Lin, K., & Wang, Y. (2019). Variants of Children with Psychopathic Tendencies in a Community Sample. *Child Psychiatry and Human Development*. Advance online publication. https://doi.org/10.1007/s10578-019-00939-9.

Humayun, S., Kahn, R. E., Frick, P. J., & Viding, E. (2014). Callous-Unemotional Traits and Anxiety in a Community Sample of 7-Year-Olds. *Journal of Clinical Child and Adolescent Psychology, 43*(1), 36–42. https://doi.org/10.1080/15374416.2013.814539.

Kahn, R. E., Frick, P. J., Youngstrom, E. A., Findling, R. L., & Youngstrom, J. K. (2012). The Effects of Including a Callous-Unemotional Specifier for the Diagnosis of Conduct Disorder. *Journal of Child Psychology and Psychiatry, 53*(3), 271–282. https://doi.org/10.1111/j.1469-7610.2011.02463.x.

Kahn, R. E., Frick, P. J., Youngstrom, E. A., Youngstrom, J. K., Feeny, N. C., & Findling, R. L. (2013). Distinguishing Primary and Secondary Variants of Callous unemotional Traits among Adolescents in a Clinic-Referred Sample. *Psychological Assessment, 25*(3), 966–978. https://doi.org/10.1037/a0032880.

Karpman, B. (1941). On the Need of Separating Psychopathy into Two Distinct Clinical Types: The Symptomatic and the Idiopathic. *Journal of Criminal Psychopathology, 3,* 112–137.

Karpman, B. (1948). Conscience in the Psychopath: Another Version. *American Journal of Orthopsychiatry, 18*(3), 455–491. https://doi.org/10.1111/j.1939-0025.1948.tb05109.x.

Kimonis, E. R., Fanti, K. A., Isoma, Z., & Donoghue, K. (2013). Maltreatment Profiles Among Incarcerated Boys with Callous-Unemotional Traits. *Child Maltreatment, 18*(2), 108–121. https://doi.org/10.1177/1077559513483002.

Kimonis, E. R., Frick, P. J., Cauffman, E., Goldweber, A., & Skeem, J. (2012). Primary and Secondary Variants of Juvenile Psychopathy Differ in Emotional Processing. *Development and Psychopathology, 24*(3), 1091–1103. https://doi.org/10.1017/S0954579412000557.

Knepley, M. J., Kendall, P. C., & Carper, M. M. (2019). An Analysis of the Child Behavior Checklist Anxiety Problems Scale's Predictive Capabilities. *Journal of Psychopathology and Behavioral Assessment, 41*(2), 249–256. https://doi.org/10.1007/s10862-019-09722-5.

Krueger, R.F., & Johnson, W. (2008). Behavioral Genetics and Personality: A New Look at the Integration of Nature and Nurture. In O.P. John, R.W., Robins & L.A. Pervin (Eds.), *Handbook of Personality: Theory and Research* (pp. 287–310). The Guilford Press.

Lapalme, M., Bégin, V., Le Corff, Y., & Déry, M. (2020). Comparison of Discriminant Validity Indices of Parent, Teacher, and Multi-Informant Reports of Behavioral Problems in Elementary Schoolers. *Journal of Psychopathology and Behavioral Assessment, 42*(1), 58–68. https://doi.org/10.1007/s10862-019-09782-7.

Marsh, H.W., Hau, K.T., & Grayson, D. (2005). *Goodness of Fit in Structural Equation Models*. In A. Maydeu-Olivares & J.J. McArdle (Eds.), *Multivariate Applications Book Series. Contemporary Psychometrics: A festschrift for Roderick P. McDonald* (pp. 275–340). Lawrence Erlbaum Associates Publishers.

Meehan, A. J., Maughan, B., Cecil, C. A. M., & Barker, E. D. (2017). Interpersonal Callousness and Co-Occurring Anxiety: Developmental Validity of an Adolescent Taxonomy. *Journal of Abnormal Psychology, 126*(2), 225–236. https://doi.org/10.1037/abn0000235.

Mejia, T. M., & Hoglund, W. L. G. (2016). Do Children's Adjustment Problems Contribute to Teacher-Child Relationship Quality? Support for a Child-Driven model. *Early Childhood Research Quarterly, 34*(1), 13–26. https://doi.org/10.1016/j.ecresq.2015.08.003.

Morizot, J. (2015). The contribution of temperament and personality traits to criminal and antisocial behavior development and desistance. In J. Morizot & L. Kazemian (Eds.). *The Development of Criminal and Antisocial Behavior,* (pp. 137–165). Springer International Publishing.

Muthén, L.K., & Muthén, B.O. (1998–2018). *Mplus User's Guide (6th ed.)*. Muthén & Muthén.

Nagin, D. S., & Odgers, C. L. (2010). Group-Based Trajectory Modeling in Clinical Research. *Annual Review of Clinical Psychology, 6,* 109–138. https://doi.org/10.1146/annurev.clinpsy.121208.131413.

Nagin, D. S., & Tremblay, R. E. (2001). Analyzing Developmental Trajectories of Distinct but Related Behaviors: A Group-Based Method. *Psychological Methods, 6*(1), 18–34. https://doi.org/10.1037/1082-989X.6.1.18.

Nagin, D. S., & Tremblay, R. E. (2005). Developmental Trajectory Groups: Fact or A Useful Statistical Fiction? *Criminology, 43*(4), 873–904. https://doi.org/10.1111/j.1745-9125.2005.00026.x.

Nakamura, B. J., Ebesutani, C., Bernstein, A., & Chorpita, B. F. (2009). A Psychometric Analysis of the Child Behavior Checklist DSM-Oriented

Scales. *Journal of Psychopathology and Behavioral Assessment, 31*(3), 178–189. https://doi.org/10.1007/s10862-008-9119-8.

Pianta, R.C. (2001). *Student-Teacher Relationship Scale: Professional manual*. Psychological Assessment.

Porter, S. (1996). Without Conscience or Without Active Conscience? The Etiology of Psychopathy Revisited. *Aggression and Violent Behavior, 1*(2), 1–11. https://doi.org/10.1016/1359-1789(95)00010-0.

Poythress, N. G., Edens, J. F., Skeem, J. L., Lilienfeld, S. O., Douglas, K. S., Frick, P. J., et al. (2010). Identifying Subtypes Among Offenders with Antisocial Personality Disorder: A Cluster-Analytic Study. *Journal of Abnormal Psychology, 119*(2), 389–400. https://doi.org/10.1037/a0018611.

Price, M., Higa-McMillan, C., Ebesutani, C., Okamura, K., Nakamura, B. J., Chorpita, B. F., & Weisz, J. (2013). Symptom Differentiation of Anxiety and Depression Across Youth Development and Clinic-Referred/Nonreferred Samples: An Examination fo Competing Factor Structures of the Child Behavior Checklist DSM-Oriented Scales. *Development and Psychopathology, 25*(4), 1005–1015. https://doi.org/10.1017/S0954579413000333.

Roberts, B. W. (2009). Back to the Future: Personality and Assessment and Personality Development. *Journal of Research in Personality, 43*(2), 137–145. https://doi.org/10.1016/j.jrp.2008.12.015.

Roorda, D.L., Zee, M. & Koomen, M.Y. (2020). Don't Forget Student-Teacher Dependency! A Meta-Analysis on Associations with Students' School Adjustment and the Moderating Role of Student and Teacher Characteristics. *Attachment and Human Development*. Advance online publication. https://doi.org/10.1080/14616734.2020.1751987.

Rohner, R. P. (1991). *Handbook for the study of parental acceptance and rejection*. Center for the Study of Parental Acceptance and Rejection: University of Connecticut.

Rohner, R.P., & Khaleque, A. (2005) *Handbook for the Study of Parental Acceptance and Rejection 4th edition*. Rohner Research Publications.

Salekin, R. T. (2017). Research Review: What do we know About Psychopathic Traits In Children? *Journal of Child Psychology and Psychiatry, 58*(11), 1180–1200. https://doi.org/10.1111/jcpp.12738.

Shiner, R.L., & Caspi, A. (2012). Temperament and the Development of Personality Traits, Adaptations, and Narratives. In M. Zentner & R.L. Shiner (Eds), *Handbook of Temperament,* (pp 497–516). The Guilford Press.

Skeem, J., Johansson, P., Andershed, H., Kerr, M., & Eno Louden, J. (2007). Two Subtypes of Psychopathic Violent Offenders that Parallel Primary and Secondary Variants. *Journal of Abnormal Psychology, 116*(2), 395–409. https://doi.org/10.1037/0021-843X.116.2.395.

Statistique Canada (2016). Revenu total médian selon le type de famille, par province et territoire de 2010 à 2014 (CANSIM, tableau 111–0009). Statistique Canada.

Vaughn, M. G., Edens, J. F., Howard, M. O., & Smith, S. T. (2009). An Investigation of Primary and Secondary Psychopathy in a Statewide Sample of Incarcerated Youth. *Youth Violence and Juvenile Justice, 7*(3), 172–188. https://doi.org/10.1177/1541204009333792.

Wang, J., & Wang, X. (2012). *Structural Equation Modeling: Applications Using Mplus.* John Wiley.

Zwaanswijk, W., van Geel, M., Andershed, H., Fanti, K. A., & Vedder, P. (2018). Variants of Psychopathy and the Dependence on Gender, Age, and Ethnic Background. *Journal of Personality Disorders, 32*(6), 721–737. https://doi.org/10.1521/pedi_2017_31_319.