

# The *DSM-5* Limited Prosocial Emotions Specifier for Conduct Disorder: Comorbid Problems, Prognosis, and Antecedents

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**Objective:** A limited prosocial emotions (LPE) subtype of conduct disorder (CD) has been added to the *DSM-5*. Empirical studies on this categorically defined subtype are scarce, and existing work is predominantly cross-sectional. Hypotheses surrounding the LPE subtype that relate to comorbidity, prognosis, and developmental antecedents, and overlap with psychopathic personality, have received no or little scrutiny.

**Method:** These knowledge gaps were addressed in a community sample of 1,839 children 8 to 10 years of age who were enrolled in the study in early childhood (age 3–5 years) and were followed up in early adolescence (age 11–13 years). Parents and teachers completed questionnaires that tap theoretically and clinically relevant features.

**Results:** Children with the LPE subtype exhibited more CD symptoms and comorbid problems, including fearlessness, and symptoms of oppositional defiant disorder and attention-deficit/hyperactivity disorder. These children were also at higher risk for future CD symptoms at the 3-year follow-up. Additionally, fearlessness, callous-unemotional traits, interpersonal traits, and harsh parenting assessed in early childhood were identified as developmental antecedents of the LPE subtype. Findings tentatively suggest that the LPE subtype is a heterogeneous group differentiated on other psychopathic personality traits.

**Conclusion:** The LPE subtype appears to identify a troubled, etiologically distinct group of children with conduct problems who are at heightened risk for future maladjustment. Findings can inform the underlying mechanisms related to the LPE subtype, and can lead to the development and improvement of prevention and intervention programs for children with conduct problems.

**Key words:** limited prosocial emotions, callous-unemotional traits, conduct disorder, subtyping, psychopathy

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**A** growing body of research suggests that children with conduct problems (CP) with either high or low callous-unemotional (CU) traits differ in severity of antisocial behavior, prognosis, and etiological risk factors.<sup>1</sup> Reflecting this evidence, the *DSM-5* added a CU-based specifier (or subtype) for the diagnosis of conduct disorder (CD). This specifier is labeled “with Limited Prosocial Emotions” (LPE) and is used when children exhibit at least 2 out of 4 criteria over at least 12 months, and in multiple relationships and settings: (1) lack of remorse or guilt; (2) callous- lack of empathy; (3) unconcerned about performance; and (4) shallow or deficient affect.<sup>2</sup> The application of this categorically defined *DSM-5* LPE specifier (from here onward referred to as “LPE specifier”) requires that the child meet full criteria for CD. Yet, it has been argued that this specifier should not only be used by means of the *DSM-5* definition of CD, because many children with severe CP may not meet formal criteria for

CD, and because being too *DSM* centric could limit our understanding of how CD develops.<sup>3</sup> Scholars, therefore, have recommended examining the viability of the LPE specifier in youths who display CP but who may not meet formal criteria for CD.<sup>3</sup>

## Empirical Studies on the LPE Specifier

The categorically defined LPE specifier is rooted in research on CU traits. Past work, nonetheless, suggests that support for the potential role of CU traits in designating distinct subgroups of youths with CD or CP cannot not be replicated when using the LPE specifier. For example, in contrast to dimensional measures of CU traits, the LPE specifier was not predictive of future outcomes.<sup>4,5</sup> Such discrepant findings might be explained not only by the loss of statistical power that hallmarks categorical conceptualizations of disorders, but also by differences in the number and content of the items used to measure CU traits and the

LPE specifier.<sup>6</sup> Hence, it is of indisputable relevance to study the CU construct as categorically defined in *DSM-5*. A literature review showed that available support for the categorically defined LPE specifier in youths with CD is poor.<sup>7</sup> Supplement 1, available online, provides a review of 8 studies that tested the viability of the LPE specifier among youths with CP. Taken together, results most robustly support the expectation that youths with the LPE subtype of CD or CP constitute a group of severely antisocial youths. With a few exceptions, these studies failed to test or to support other hypotheses surrounding the LPE specifier (eg, children with the LPE subtype show poor treatment responsiveness). Clearly, research on the specifier is in its infancy, and important knowledge gaps must be addressed.

### Knowledge Gaps in Research on the LPE Specifier

It is relevant to test the predictive ability of the LPE specifier, especially because studies among youths with CD or CP failed to confirm the specifier's prognostic usefulness (see Supplement 1, available online).<sup>7</sup> One study even showed that adolescents with a CP+LPE classification were at *lower* risk for future criminality than those with a CP-only classification.<sup>4</sup> Also, only 1 study tested the specifier's diagnostic continuity, and revealed that 14.5% of the children initially classified as CP+LPE were again classified as such 6 years later.<sup>8</sup> Support for the prognostic usefulness of the LPE specifier is clearly lacking.

According to theory, children with serious CP and elevated CU traits have a fearless temperament, which is not true for other children with serious CP.<sup>9</sup> Only 2 longitudinal studies have tested this hypothesis, yielding conflicting findings. Specifically, adolescents with CP and CU traits were shown to be *more* fearless at age 2 years than their CP-only counterparts,<sup>10</sup> whereas children with CP and CU traits were shown to be *less* fearless at 6 and 12 months of age in another study.<sup>11</sup> No study to date has tested prospective relations between early childhood fearlessness and a CP+LPE classification later in life.

Theory also states that harsh parenting does not relate to the level of CP in children with co-occurring CU traits,<sup>9</sup> suggesting that children with CP and CU traits experienced *less* harsh parenting earlier in life than those with CP only. Yet, the few longitudinal studies that tested this suggestion showed that children with CP and CU traits actually experienced *more* harsh parenting in early childhood.<sup>10,12</sup> These studies are not without methodological limitations, for example, because they failed to control for baseline levels of CP or used unreliable measures of CU traits and parenting.<sup>13</sup> Crucially, it is unknown whether harsh parenting in early

childhood is related to a later CP+LPE classification, and whether this relation holds after controlling for important child risk factors early in life, such as fearlessness.

Finally, CU traits, and as a result the LPE specifier, represent downward extensions of the affective features of adult psychopathy, usually defined as a multidimensional construct including CU, interpersonal (eg, grandiosity), and behavioral (eg, thrill-seeking) components.<sup>14</sup> Concretely, individuals with psychopathy are characterized by high scores on all components. Notwithstanding that CU traits capture only 1 psychopathy component, there is a tendency in the literature to use CU traits interchangeably with psychopathy, especially when CU traits co-occur with CD or CP.<sup>15-17</sup> This trend is challenged by evidence that youths high on all psychopathy components can be differentiated from those high on the CU component alone.<sup>18-20</sup> Yet, it has not been tested whether individuals with the LPE subtype also score simultaneously high on the interpersonal and behavioral psychopathy components. Hence, the idea that the LPE subtype of CP greatly represents the multidimensional psychopathy construct remains highly speculative. It is also often assumed that CU traits emerge first and that the other psychopathic traits develop later as downstream manifestations of CU traits.<sup>21</sup> This has not been examined, which is unfortunate because all psychopathy components are associated with theoretically relevant features in early childhood (eg, conduct problems, aggression, and fearlessness).<sup>22</sup>

### This Study

This longitudinal study will test the viability of the LPE specifier in 8- to 10-year olds, whilst relying on multiple informants. Based on previous findings,<sup>23</sup> we hypothesized that anywhere between 10% and 50% of children with CP might meet criteria for the LPE specifier. In line with prior reviews on the importance of CU traits,<sup>1</sup> we expected higher levels of concurrent CD and oppositional defiant disorder (ODD) symptoms as well as fearlessness in children with the LPE subtype. Given the age range of our sample, no differences in concurrent attention-deficit/hyperactivity disorder (ADHD) symptoms were expected.<sup>24</sup> We also hypothesized that children with the LPE subtype would exhibit the highest risk for future CD and ODD symptoms at the 3-year follow-up. The LPE specifier's diagnostic continuity was also explored. With regard to etiology, we expected that higher levels of fearlessness and harsh parenting in early childhood would increase the risk for a CP+LPE classification at age 8 to 10 years. Finally, we tentatively explored whether the LPE subtype would overlap

with psychopathic personality, and whether interpersonal and behavioral psychopathy components (assessed in early childhood) would be related to a later CP+LPE classification.

## METHOD

### Research Participants and Procedure

The data used in this study come from the Social and Physical Development, Interventions and Adaption (SOFIA) study, an ongoing prospective longitudinal study aiming to advance knowledge on social adjustment, psychological well-being, and health. The SOFIA study includes all children born between 2005 and 2007 attending preschools during the spring of 2010 (2,542 children) in a mid-sized (approximately 85,000 citizens) Swedish municipality. The demographics of the municipality are largely proportional to the rest of Sweden in terms of sex, age, level of education, and employment, as well as mixture of urban and rural areas. The first wave of data collection was conducted in 2010 (when the children were age 3–5 years); the second wave in 2011 (age 4–6 years); the third wave in 2012 (age 5–7 years); the fourth wave in 2015 (age 8–10 years); and the fifth wave in 2018 (age 11–13 years). In total, 2,121 (85.7% of target population; 47% girls and 53% boys) of the children's parents gave active consent to their child's participation in the study. At wave 1, teacher- and/or parent-ratings were available for 2,113 (99.6%) and 2,008 (94.7%) of these 2,121 children, respectively. For the next waves, these numbers (and percentages) were as follows: wave 2 = 2,014 (96.2%) and 1,929 (90.9%); wave 3 = 1,934 (91.2%) and 1,829 (86.2%); wave 4 = 1,829 (86.2%) and 1,654 (78%); and wave 5 = 1,735 (81.8%) and 1,420 (66.8%).

In this study, data from all but 1 of the waves were used. Specifically, wave 4 data were used for group assignment (classifications) and cross-sectional comparisons, whereas wave 1 and wave 2 data were used to test links between early childhood antecedents and wave 4 group assignments. Finally, wave 5 data were used to investigate the prognostic usefulness of the group assignments. Unless otherwise specified, data for 1,839 children (86.7%) were used in the analyses. The 284 children who were not included in this study because data for group assignments were missing were younger, of higher socioeconomic status (SES), and less often of non-Swedish origin, but did not differ with regard to sex or early childhood CP and CU traits (Supplement 2, available online). Details about the procedure and ethical approval can be found in Supplement 3, available online.

## Measures

For all measures, informants rated the items while considering the last 6 months. Unless otherwise specified, mean scores were calculated, and information from teacher and parents were combined to reflect the highest mean score from any informant.

### Measures for Group Assignments (Age 8–10 Years)

Parents and teachers rated 10 conduct problem items that were closely based on *DSM-IV* criteria for ODD and CD, and were relevant to preschool children, and older children and adolescents.<sup>25</sup> All items can be found in Supplement 4, available online. Items were scored using a 5-point response scale (1 = never to 5 = very often). The reliability of these scales and all other scales are reported in Table S1, available online. The LPE specifier most often has been studied by means of 4 items, 1 item for 1 LPE criterion (see Supplement 1, available online).<sup>7</sup> Therefore, parents and teachers were asked to rate 4 items, using a 4-point response scale (1 = does not apply at all; 2 = applies fairly badly; 3 = applies pretty well; 4 = applies precisely). Echoing prior work, we recoded these 4 items into present (applies pretty well to applies precisely) or absent (does not apply at all to applies fairly badly), while using the informant (ie, teacher or parent) with the highest score.<sup>23,26,27</sup> Children for whom 2 or more criteria were present were considered to meet criteria for the LPE specifier. These LPE items and support for the validity of this novel LPE scale are available in Supplement 4, available online. Table S2, available online, reports percentages of the LPE criteria that were present according to the teacher-ratings and parent-ratings, and when using the informant with the highest score.

### Measures for Cross-Sectional Group Comparisons (Age 8–10 Years)

Both CD and ODD symptoms were assessed through the corresponding *DSM*-oriented scales of the Teacher Report form (TRF) and its parent version, the Child Behavior Checklist (CBCL).<sup>28</sup> Teacher rated symptoms of ADHD symptoms by means of the DuPaul ADHD Rating Scale, to assess the 18 *DSM-IV* criteria for ADHD.<sup>29</sup> Teachers also completed the 6-item Child Fearlessness Scale (see Supplement 4, available online)<sup>25</sup> and the 28-item Child Problematic Traits Inventory (CPTI).<sup>25</sup> The CPTI was developed for use in 3- to 12-year-old children, received strong psychometric support in various settings and countries,<sup>22,30,31</sup> and includes callous-unemotional, interpersonal, and behavioral components of the psychopathy construct. Parents completed 7 items designed to assess harsh parenting in the SOPHIA study and a set of questions

relating to age, sex, and SES (see Supplement 4, available online).

### Measures of Outcomes (Age 11–13 Years)

At wave 5, conduct problems, the LPE specifier, and CD and ODD symptoms were measured and defined as described earlier.

### Measures of Developmental Antecedents (Age 3–6 Years)

At wave 1 (age 3–5 years) and wave 2 (age 4–6 years), conduct problems, ADHD symptoms, fearlessness, psychopathy components, and harsh parenting were measured and defined as described earlier. For each wave, the mean of the items was calculated and then combined to reflect the highest mean score from wave 1 or wave 2.

### Statistical Analyses

CP at age 8 to 10 years was defined as a score higher than 1.25 SD above the mean. By doing so, 10.5% ( $n = 193$ ) of the children were identified as exhibiting CP. This percentage closely resembles the 9.3% prevalence of CP in a previous Swedish cohort study,<sup>32</sup> and facilitates comparison with various studies on CU traits that identified 5% to 10% of the sample as exhibiting CP.<sup>10,11,33,34</sup> Children were then assigned to 4 mutually exclusive groups based on their CP (above versus below cut-off) and LPE ( $<2$  versus  $\leq 2$  criteria of LPE specifier) scores, as follows: CP Only ( $n = 103$ ; 5.6%); CP+LPE ( $n = 90$ ; 4.9%); LPE Only ( $n = 73$ ; 4.0%); and Controls ( $n = 1,573$ ; 85.5%). These 4 groups are included in the 4 sets of analyses described next.

The first set of analyses focuses on cross-sectional comparisons (age 8–10 years), and used  $\chi^2$  tests for categorical variables and 1-way analyses of variance for continuous variables.

The second set of analyses focuses on prognostic usefulness and stability. Specifically, analyses of variance were performed to test whether the 4 groups differed in CD and ODD symptoms at age 11 to 13 years. To test the prognostic usefulness of the LPE specifier above the severity of CP, and comorbid problems,<sup>9,35</sup> we also performed analyses of covariance controlling for baseline (age 8–10 years) levels of CD/ODD, as well as ADHD symptoms. The proportion of individuals with a classification at age 8 to 10 years who retain the same classification at age 11 to 13 years was calculated as an index of stability (also called “prospective consistency”).<sup>36</sup>

The third set of analyses focuses on etiology, and relied upon a series of multinomial logistic regression models computed to test whether early childhood antecedents (age 3–6 years) are predictive of classifications at age 8 to 10 years.

Specifically, models 1 to 3 tested whether fearlessness (model 1), CU traits (model 2), and harsh parenting (model 3) would predict severe CP, above and beyond well-established antecedents of severe CP, being early childhood CP and ADHD symptoms. Model 4 was used to illuminate whether fearlessness, CU traits, and harsh parenting would be predictive of the LPE subtype after controlling for their overlap, but also for CP and ADHD symptoms.

In the fourth set of analyses, we tentatively explored the overlap between the LPE subtype and psychopathic personality (for details, see Supplement 5, available online), and used multinomial logistic regression to explore whether 3 psychopathy components (age 3–6 years) would be predictive of the LPE subtype (age 8–10 years), after controlling for their overlap and other early childhood risk factors (ie, CP, fearlessness, and harsh parenting). As shown in Table S3, available online, few significant group differences emerged in regard to age, sex, national/ethnic origin, and SES, although the CP+LPE and CP Only groups did not significantly differ in regard to these features. Therefore, these sociodemographic features were not included as control variables in the analyses.<sup>25</sup> Statistical analyses were performed using SPSS 25.0. All tests were 2 tailed, with .05 as the standard for statistical significance, with post hoc correction for multiple group comparisons (sets 1 and 2).

## RESULTS

### Cross-Sectional Group Comparisons (Age 8–10 Years)

**Grouping Variables.** Children with a CP+LPE classification exhibited the highest level of CP, followed by children with CP Only, LPE Only, and Controls classifications. LPE Only and CP+LPE classifications did not differ in regard to the proportions of children who met individual LPE criteria (Table S4, available online).

**External Variables and Comorbid Problems.** Compared to children with other classifications, those with a CP+LPE classification exhibited the highest levels of CD, ODD, and ADHD symptoms, and fearlessness (Table 1). Overall, children with a CP Only classification scored higher in these features than children classified as LPE Only and Controls. Finally, children with an LPE Only classification were higher in regard to all features than were children classified as Controls.

### Stability and Predicting Outcomes in Adolescence (Age 11–13 Years)

**Stability.** About 43% ( $n = 75$ ) of the children who exhibited CP at age 8 to 10 years exhibited CP at the 3-year follow-up. As depicted in Figure 1, of the children who were initially classified as CP+LPE, 37.5% were again classified as

**TABLE 1** Cross-Sectional Group Differences at Age 8 to 10 Years (N = 1,839)

|                     | (1) Controls<br>(n = 1,573) | (2) CP only<br>(n = 103) | (3) LPE only<br>(n = 73)  | (4) CP+LPE<br>(n = 90)   | Test Statistic         | (2) vs (1) | (3) vs (1) | (4) vs (1) | (2) vs (3) | (4) vs (3) | (4) vs (2) |
|---------------------|-----------------------------|--------------------------|---------------------------|--------------------------|------------------------|------------|------------|------------|------------|------------|------------|
|                     | Mean (SD)                   | Mean (SD)                | Mean (SD)                 | Mean (SD)                | Welch F; p; $\eta^2$   | d          | d          | d          | d          | d          | d          |
| Symptoms of         |                             |                          |                           |                          |                        |            |            |            |            |            |            |
| CD (t + p)          | 1.05 (0.09) <sup>a</sup>    | 1.44 (0.31) <sup>b</sup> | 1.24 (0.21) <sup>c</sup>  | 1.80 (0.41) <sup>d</sup> | 171.36; p < .001; 0.60 | 1.71       | 1.18       | 2.53       | 0.75       | 1.72       | 0.99       |
| ODD (t + p)         | 1.28 (0.32) <sup>a</sup>    | 2.05 (0.40) <sup>b</sup> | 1.59 (0.35) <sup>c</sup>  | 2.34 (0.40) <sup>d</sup> | 319.27; p < .001; 0.43 | 2.12       | 0.92       | 2.93       | 1.22       | 2.00       | 0.73       |
| ADHD (t)            | 1.51 (0.66) <sup>a</sup>    | 2.69 (1.04) <sup>b</sup> | 2.32 (0.96) <sup>b</sup>  | 3.38 (0.99) <sup>c</sup> | 154.13; p < .001; 0.31 | 1.35       | 0.98       | 2.22       | 0.37       | 1.01       | 0.68       |
| Fearlessness (t)    | 1.14 (0.31) <sup>a</sup>    | 1.62 (0.65) <sup>b</sup> | 1.32 (0.51) <sup>c</sup>  | 2.09 (0.84) <sup>d</sup> | 56.30; p < .001; 0.27  | 0.94       | 0.43       | 1.50       | 0.51       | 1.11       | 0.63       |
| Harsh parenting (p) | 1.23 (0.27) <sup>a</sup>    | 1.41 (0.37) <sup>b</sup> | 1.37 (0.44) <sup>ab</sup> | 1.46 (0.46) <sup>b</sup> | 14.35; p < .001 ; 0.04 | 0.55       | 0.38       | 0.60       | 0.10       | 0.20       | 0.12       |

**Note:** The Welch F was used because the homogeneity of equal variances was violated; different superscript letters denote significant ( $p < .05$ ) differences between groups in pairwise comparisons, using the Games–Howell as post hoc test for multiple group comparisons (note that, with a few exceptions, all significant group differences were significant at  $p < .001$ ); because of missing values, the total sample size for ADHD was 1,822 (controls:  $n = 1,559$ ; CP only:  $n = 102$ ; LPE only:  $n = 72$ ; CP+LPE:  $n = 89$ ) and for Fearlessness 1,813 (controls:  $n = 1,552$ ; CP only:  $n = 102$ ; LPE only:  $n = 72$ ; CP+LPE:  $n = 89$ ). To test the magnitude of the group differences, effect sizes ( $d$ ) were calculated and interpreted as follows:  $d \leq 0.29$  referring to small effect sizes;  $0.29 < d < 0.80$ , moderate effect sizes; and  $0.80 \leq d$ , large effect sizes. ADHD = attention-deficit/hyperactivity disorder; CD = conduct disorder; CP = teacher- and parent-rated conduct problems; LPE = teacher- and parent-rated limited prosocial emotion specifier; ODD = oppositional defiant disorder; (p) = based on parent-ratings only; (t) = based on teacher-ratings only; (t+p) = based on combined teacher- and parent-ratings.

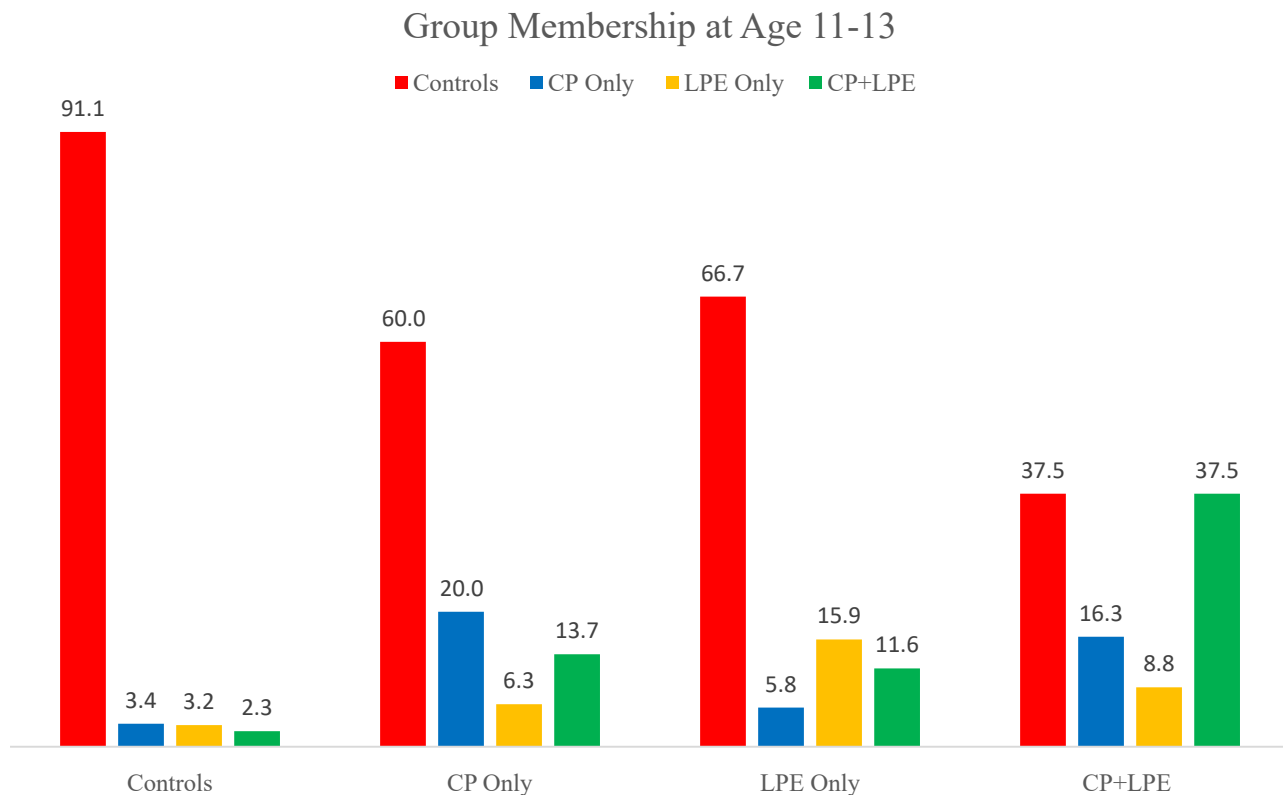
CP+LPE 3 years later. This percentage was higher than the percentages of children who were initially classified as CP Only, LPE Only, or Controls but were later classified as CP+LPE ( $\chi^2 = 226.78$ ;  $p < .001$ ). Additional analyses revealed a correlation coefficient ( $r$ ) of 0.56 and 0.37 ( $p < .001$ ) for the dimensional CP score and the number of LPE criteria at both time points, respectively.

**CD Symptoms.** Children with a CP+LPE classification (mean [SD] = 1.44 [0.44]) had higher levels of future CD symptoms than children classified as CP Only (mean [SD] = 1.27 [0.29]), LPE Only (mean [SD] = 1.18 [0.22]), and Controls (mean [SD] = 1.08 [0.18]; Welch  $F_{3,1760} = 32.90$ ;  $p < 0.001$ ;  $\eta^2 = 0.14$ ). Children with CP Only and LPE Only classifications also were higher in regard to future CD symptoms than children classified as Controls, but did not differ from each other. After controlling for levels of disruptive behavior disorder (ie, CD and ODD) symptoms and ADHD symptoms at age 8 to 10 years, children with a CP+LPE classification remained higher in regard to future CD symptoms than children with any of the 3 other classifications, although the other differences were no longer significant (see Supplement 6, available online).

**ODD Symptoms.** Children with a CP+LPE classification (Mean [SD] = 1.95 [0.57]) had the highest level of future ODD symptoms, followed by children classified as CP Only (mean [SD] = 1.69 [0.50]), LPE Only (mean [SD] = 1.44 [0.45]), and Controls (mean [SD] = 1.28 [0.39]; Welch  $F_{3,1759} = 57.39$ ;  $p < .001$ ;  $\eta^2 = 0.15$ ). All group differences were significant. Yet, after controlling for levels of DBD and ADHD symptoms at age 8 to 10 years, none of these differences remained significant (see Supplement 6, available online).

### Early Childhood Antecedents (Age 3–6 Years)

Table S5, available online, presents means (SDs) for early childhood antecedents across groups. Table 2 (models 1–3) shows that, after controlling for CP and ADHD symptoms, children with higher levels of fearlessness were more likely to receive a CP+LPE classification at age 8 to 10 years than any other classification (model 1). Also, CU traits increased the risk of later CP+LPE and LPE Only classifications, relative to CP Only and/or Controls classifications (model 2). Children who experienced higher levels of harsh parenting were less likely to be classified as Controls, relative to any other classifications (model 3). As shown in Table 2 (model 4), fearlessness and harsh parenting uniquely increased the risk of CP+LPE, relative to CP Only and Controls classifications, whereas fearlessness also increased the risk of a CP+LPE (versus LPE Only) classification.

**FIGURE 1** Stability of Diagnostic Classifications From the Initial Assessment to the 3-Year Follow-up, Expressed as Percentages

**Note:** Adapted from the Journal of the American Academy of Child and Adolescent Psychiatry, Vol 51, Issue 1, Pardini et al.<sup>8</sup>, "The Clinical Utility of the Proposed DSM-5 Callous-Unemotional Subtype of Conduct Disorder in Young Girls." 2012, with permission from Elsevier. <https://doi.org/10.1016/j.jaac.2011.10.005>. Because of missing values at wave 5, the number of research participants included in this analysis for each group was as follows: controls:  $n = 1,513$ ; CP only:  $n = 95$ ; LPE only:  $n = 69$ ; CP+LPE:  $n = 80$ . CP = teacher- and parent-rated conduct problems; LPE = teacher- and parent-rated limited prosocial emotion specifier.

### The Multidimensional Psychopathy Construct: Exploring Its Usefulness for Subtyping Approaches and Developmental Research

**Overlap With Putative Psychopathic Personality at Age 8 to 10 Years.** Table S6, available online, reports mean interpersonal psychopathy (IP) and behavioral psychopathy (BH) components scores. Using the strategy described in Supplement 5, available online, 56 (63%) of those individuals with a CP+LPE classification were high on both the IP and BH components (tentatively labeled "putative psychopathic personality" [PPP]). Of the remaining 34 children (36%) without a PPP label, 9 (10%) were high on the IP component only, 11 (12%) high on the BH component only, and 14 (15%) low on both components (tentatively labeled "pure CP+LPE"). Supplement 7, available online, shows that (1) children with a PPP label ( $n = 56$ ) were higher in CD, ODD, and ADHD symptoms and fearlessness than were their

counterparts with a "pure CP+LPE" label ( $n = 14$ ); and that (2) these findings were well replicated when comparing "PPP ( $n = 56$ )" to "without PPP ( $n = 34$ )".

**Three Psychopathy Components in Early Childhood (Age 3–6 Years).** Table 3 shows that interpersonal traits, fearlessness, and harsh parenting increased the risk of being classified as CP+LPE as compared to CP Only and Controls, after controlling for their overlap, CP, CU traits, and the BH component. Early childhood CU traits and harsh parenting increased the risk of a CP+LPE, CP Only, or LPE Only classification, relative to a Controls classification.

### DISCUSSION

The LPE specifier designated 42% of the children with CP, a percentage that falls in the expected 10% to 50% range.

**TABLE 2** Early Childhood Antecedents (Age 3–6 Years) of Group Assignments at Age 8 to 10 Years When Controlling for Early Childhood Conduct Problems and Attention-Deficit/Hyperactivity Disorder Symptoms (Age 3–6 Years)<sup>a</sup>

|                     | CP only vs controls     | LPE only vs controls    | CP+LPE vs controls      | CP only vs LPE only | CP+LPE vs LPE only      | CP+LPE vs CP only       |
|---------------------|-------------------------|-------------------------|-------------------------|---------------------|-------------------------|-------------------------|
| Model 1             |                         |                         |                         |                     |                         |                         |
| Fearlessness (t)    | 1.14 (0.91–1.44)        | 1.13 (0.85–1.49)        | <b>1.69</b> (1.34–2.14) | 1.02 (0.72–1.43)    | <b>1.50</b> (1.06–2.12) | <b>1.48</b> (1.10–2.00) |
| Model 2             |                         |                         |                         |                     |                         |                         |
| CU traits (t)       | 1.25 (0.98–1.59)        | <b>1.60</b> (1.21–2.10) | <b>1.74</b> (1.35–2.23) | 0.77 (0.55–1.11)    | 1.09 (0.77–1.54)        | <b>1.39</b> (1.01–1.91) |
| Model 3             |                         |                         |                         |                     |                         |                         |
| Harsh parenting (p) | <b>1.86</b> (1.37–2.52) | <b>2.01</b> (1.43–2.82) | <b>2.65</b> (1.97–3.55) | 0.92 (0.61–1.41)    | 1.32 (0.87–1.99)        | 1.43 (0.98–2.98)        |
| Model 4             |                         |                         |                         |                     |                         |                         |
| Fearlessness (t)    | 1.03 (0.81–1.30)        | 0.99 (0.75–1.32)        | <b>1.50</b> (1.19–1.90) | 1.03 (0.73–1.46)    | <b>1.51</b> (1.07–2.15) | <b>1.47</b> (1.09–1.97) |
| CU traits (t)       | <b>1.33</b> (1.04–1.69) | <b>1.76</b> (1.33–2.33) | <b>1.78</b> (1.38–2.29) | 0.75 (0.53–1.07)    | 1.01 (0.71–1.44)        | 1.34 (0.97–1.85)        |
| Harsh parenting (p) | <b>1.93</b> (1.43–2.61) | <b>2.26</b> (1.55–3.01) | <b>2.96</b> (2.21–3.97) | 0.90 (0.59–1.36)    | 1.37 (0.91–2.07)        | <b>1.05</b> (1.05–2.23) |

**Note:** Data are odds ratio (95% CI). Boldface type indicates significant odds ratios. Models 1 to 3 include 3 predictors; model 4 includes 5 predictors. For all variables but harsh parenting, the number of children in each group was as follows: Controls:  $n = 1,568$ – $1,571$ ; CP only:  $n = 102$ – $103$ ; LPE only:  $n = 70$ – $73$ ; CP+LPE:  $n = 89$ – $90$ . For harsh parenting, the number of research participants in each group was as follows: Controls:  $n = 1,555$ ; CP only:  $n = 102$ ; LPE only:  $n = 70$ ; CP+LPE:  $n = 89$ . CP = teacher- and parent-rated conduct problems; CU = callous-unemotional; LPE = teacher- and parent-rated limited prosocial emotion specifier; (p) = based on parent-ratings only; (t) = based on teacher-ratings only.

<sup>a</sup>Odds ratios for teacher- and parent-rated early childhood conduct problems and teacher-rated early childhood attention-deficit/hyperactivity disorder symptoms are provided in Table S7, available online

Children with a CP+LPE classification also exhibited higher levels of CD and ODD symptoms than their CP Only counterparts, suggesting that the LPE specifier identifies a severe subgroup of antisocial youths. Results also confirmed higher levels of concurrent fearlessness in children with the LPE subtype.<sup>26</sup> Theoretically, youths with the LPE subtype are expected to display more ADHD symptoms,<sup>37</sup> except when one specifically focus on childhood-

onset CP or CD.<sup>24</sup> In line with prior work,<sup>8,38</sup> children with the LPE subtype of CP exhibited more ADHD symptomatology, suggesting that a CP+LPE classification also increases the risk for co-occurring ADHD symptoms in children with early-onset CP.

Contrasting expectations,<sup>1</sup> studies on the LPE subtyping scheme failed to confirm its predictive utility.<sup>4,5,8,38</sup> This investigation is the first to demonstrate that children with the

**TABLE 3** Early Childhood (Age 3–6 Years) Psychopathy Components As Antecedents of Classifications at Age 8 to 10 Years When Controlling for Early Childhood Conduct Problems (Age 3–6 Years)<sup>a</sup>

|                          | CP only vs controls     | LP only vs controls     | CP+LPE vs controls      | CP only vs LPE only | CP+LPE vs LPE only | CP+LPE vs CP only       |
|--------------------------|-------------------------|-------------------------|-------------------------|---------------------|--------------------|-------------------------|
| CU traits (t)            | <b>1.55</b> (1.21–1.99) | <b>2.09</b> (1.58–2.75) | <b>1.89</b> (1.46–2.46) | 0.74 (0.52–1.06)    | 0.91 (0.63–1.30)   | 1.22 (0.88–1.70)        |
| Interpersonal traits (t) | <b>0.67</b> (0.51–0.89) | 0.75 (0.53–1.07)        | <b>1.14</b> (0.86–1.51) | 0.89 (0.58–1.37)    | 1.52 (0.99–2.31)   | <b>1.70</b> (1.20–2.42) |
| Behavioral traits (t)    | 0.99 (0.75–1.32)        | 0.77 (0.55–1.08)        | 0.89 (0.65–1.21)        | 1.30 (0.85–1.98)    | 1.16 (0.75–1.79)   | 0.89 (0.61–1.31)        |
| Fearlessness (t)         | 1.13 (0.88–1.46)        | 1.22 (0.90–1.67)        | <b>1.73</b> (1.32–2.24) | 0.92 (0.63–1.35)    | 1.41 (0.96–2.07)   | <b>1.52</b> (1.09–2.12) |
| Harsh parenting (p)      | <b>1.93</b> (1.42–2.61) | <b>2.12</b> (1.53–2.96) | <b>2.93</b> (2.19–3.93) | 0.91 (0.63–1.30)    | 1.38 (0.92–2.07)   | <b>1.52</b> (1.04–2.21) |

**Note:** Data are odds ratio (95% CI). This model include all 5 predictors displayed in this table, along with conduct problems. Significant odds ratios are shown in boldface type. For all variables but harsh parenting, the number of children in the controls group ranged from 1,568 to 1,571. For harsh parenting, the number of research participants in each group was: Controls:  $n = 1,555$ ; CP only:  $n = 102$ ; LPE only:  $n = 70$ ; CP+LPE:  $n = 89$ . CP = teacher- and parent-rated conduct problems; CU = callous-unemotional; LPE = teacher- and parent-rated limited prosocial emotion specifier; (p) = based on parent-ratings only; (t) = based on teacher-ratings only.

<sup>a</sup>Odds ratios for early childhood conduct problems are provided in Table S7, available online. Because attention-deficit/hyperactivity disorder (ADHD) symptoms and behavioral traits were strongly correlated ( $r = .84$ ;  $p < .001$ ), and because the focus here is on psychopathy components, ADHD symptoms were excluded from this analysis. Correlation coefficients between all other predictors in the model ranged from 0.06 to 0.69 (details available upon request).

LPE subtype of CP displayed higher levels of future antisocial behavior. Importantly, this finding held after controlling for CP, ODD, and ADHD symptoms, indicating that the specifier's prognostic usefulness cannot be explained by severity of CP at baseline.<sup>35</sup> In terms of diagnostic continuity, 37% of the children initially classified as having the LPE subtype of CP were again classified as CP+LPE at follow-up. This percentage is substantially higher than the 14% stability of the LPE specifier in children,<sup>8</sup> and similar to estimates for CP in this study (43%), CD in children (eg, 33%),<sup>39</sup> and antisocial personality disorder in adults (eg, 32%).<sup>40</sup> Echoing earlier interpretations of stability estimates,<sup>39,40</sup> the 37% LPE estimate is indicative of considerable diagnostic discontinuity. Arguably, dichotomized variables may not be the best way to evaluate stability.<sup>3</sup> However, clinicians who use the LPE specifier by definition rely on a dichotomized construct. Consequently, our stability estimates cannot be easily discarded, especially not because moderate temporal stability ( $r = 0.33$ ) also emerged when using a dimensional measure of LPE.

A fearless temperament can place the child at risk for antisocial behavior and CU traits,<sup>41</sup> indicating that children with the LPE subtype displayed higher levels of fearlessness earlier in life. This notion has hardly been tested, and the few longitudinal studies that supported this assertion failed to control for earlier levels of CP or CU.<sup>10,12</sup> We present novel evidence showing that fearlessness (age 3–6 years) is an antecedent of a CP+LPE (versus CP Only) classification (age 8–10 years), even after controlling for child (eg, CP, CU traits) and environmental (ie, harsh parenting) risk factors. Importantly, this prospective relation also held when contrasting CP+LPE with LPE Only and Controls classifications, suggesting that fearlessness is an important antecedent in the development of the LPE subtype of CP. Altogether, results support calls to consider fearlessness as an important target for intervention programs.<sup>10</sup>

Children who were exposed to harsh parenting practices in early childhood were more likely to receive a CP Only or CP+LPE classification, relative to a Control classification. This is congruent with evidence that harsh parenting is a developmental precursor of antisocial behavior<sup>42</sup> and a likely precursor of CU traits.<sup>13</sup> Findings held after controlling for a host of child risk factors, which is particularly promising because prior work showed that harsh parenting at age 4 years was no longer related to CP Only and CP+CU subtypes at age 7 years, when controlling for earlier CP.<sup>12</sup> However, our study could not confirm the expectation that CP+LPE children experienced *less* harsh parenting earlier in life than their CP Only counterparts. This finding dovetails with prior work,<sup>12</sup> and seems to contradict suggestions that children classified as CP+LPE

develop conduct problems independently of harsh parenting.<sup>9</sup> However, the current study's design is not well suited to test this theory, and studies that use more fine-grained analyses are needed.

Exploratory analyses showed that the 66% of children with a CP+LPE classification who also displayed a "putative psychopathic personality" (PPP) exhibited higher levels of concurrent CD, ODD, and ADHD symptoms, as well as fearlessness, as compared to the 33% youths with a CP+LPE classification who did not display a PPP. Such findings also tentatively suggest that CP+LPE and PPP classifications can both inform CP heterogeneity, but should not be used interchangeably. In line with a series of studies,<sup>18–20</sup> we provide preliminary support for recent recommendations to consider the multidimensional psychopathy construct for subtyping purposes.<sup>43</sup> Yet, it is unclear how to categorically define the interpersonal and behavioral psychopathy components, indicating that findings must be carefully interpreted, and cannot be used to firmly conclude that the LPE specifier and PPP do not substantially overlap. Furthermore, novel evidence also suggests that psychopathy components other than CU traits can advance knowledge about antecedents of the LPE subtype of CP. Results specifically revealed that the interpersonal psychopathy component was uniquely predictive of later CP+LPE (versus CP Only), but not the CU component. This finding converges with cross-sectional work that underscore the importance of interpersonal traits,<sup>22,44</sup> and warrants against the use of "CU measures" that mix CU and interpersonal traits.<sup>10,45,46</sup>

Children with an LPE Only classification are typically overlooked. The LPE Only group was relatively rare, making up only 4% of our total sample, a percentage that very closely resembles the 4.3% to 4.7% prevalence rate reported in prior work with community samples of children.<sup>8,23</sup> We demonstrated that these children exhibited higher concurrent levels of CD, ODD, and ADHD symptoms and fearlessness than children without either CD or LPE (ie, Controls). This finding, and its consistency with some research,<sup>8,23</sup> supports speculations that the LPE specifier has diagnostic value in the absence of CD or CP.<sup>47</sup> Yet, not all studies have revealed such differences,<sup>6,48</sup> underscoring the need for further study on features and outcomes of LPE Only.

This study has various strengths, including its low attrition rate and multi-informant and longitudinal design. As always, findings need to be considered in the context of some limitations. First, the LPE scale has been developed specifically for this study and has not yet been used in other work. Nevertheless, well-known scales that have been used in the development of and research on the LPE specifier

have typically failed to provide support for the LPE subtyping scheme (Supplement 1, available online).<sup>6</sup> Thus, this scale might be informative for future work. Second, diagnostic interviews designed to assess the LPE specifier or to determine the presence of CD were not performed. However, studies that used an interview-based LPE tool reported only a few findings that supported the LPE subtyping scheme among youths with an ODD/CD diagnosis.<sup>49</sup> Third, a limitation is that we did not run analyses separately by sex (see also Fanti *et al.*<sup>26</sup>), which should be addressed by future research.

With these limitations in mind, current findings demonstrated that the LPE specifier identifies a group of children who exhibit severe behavioral disturbances and are at risk for future maladjustment. This bears relevance in the light of evidence that treatment success increases when interventions are tailored to the unique needs of children with the CU subtype of CP.<sup>1</sup> However, because past work yielded less convincing findings in support of the specifier's clinical usefulness,<sup>7,49</sup> the LPE specifier should not yet be used for decision making and treatment planning. Fearlessness and harsh parenting are prominent risk factors in many theories surrounding the development of CU traits,<sup>50</sup> and our findings underscore the relevance of these measures, but also the need for further study in terms of how fearlessness and parenting give rise to CU traits. Importantly, CP Only also constituted a troubled group at risk for comorbid problems and future CD symptoms, indicating that

these children should not be ignored. Overall, our findings can lead to the development and improvement of future prevention and intervention programs for children with CP.

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