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Emergence of conduct problems in young children in Colombia: are there general and culture specific processes?

PhD in Psychology (full-time)

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Abstract

Conduct problems (CPs) in young children have been widely studied but mainly in 'High Income' Countries (HICs) raising the question of whether the processes are the same in 'Low and Middle-Income' Countries (LMICs). This PhD study was conducted in Colombia, a LMIC historically conflict affected. Its aims were to identify whether there are general and culture-specific processes regarding the role of Callous-Unemotional (CU) traits -characterised by disregard for others and lack of empathy- in relation to CPs, and to examine the role of parenting in relation to CU traits in the context of exposure to community violence. I established the *La Sabana Parent-child Study* with 235 children at ages 3.5 years from three Colombian regions and assessed them via parent report and observations of parents and children in standard play and tidy-up procedures. Measurement paralleled that of the UK *Wirral Child Health and Development Study* to allow for cross-cultural analyses. I reassessed 220 (93.6%) at age 5 years. The main findings reported in the four papers presented here are: 1) Commonly used measures of CU traits (ICU - Inventory of Callous-Unemotional Traits) and parenting (Alabama Parenting Questionnaire) have similar psychometric properties in this sample as in HIC samples and show predicted patterns of association (Paper 1). The ICU is valid as evidenced in incremental prediction of later aggression (Paper 2). 2) In a novel finding for HIC and LMIC research, prediction from CU traits at age 3.5 to aggression at age 5 was substantially greater in the presence of pre-existing aggression suggesting a synergistic effect and replicated across Colombian and UK samples (Paper 2). 3) Vulnerability for later aggression created by CU traits is ameliorated by maternal praise and positivity (Paper 3). 4) Children's exposure to community violence is associated with elevated CU traits at age 5, but only among mothers with low levels of positivity at age 3.5 (Paper 4). In conclusion, CU traits is a valid construct in a sample of young children from a LMIC and have a role in the maintenance and amplification of early aggression. Also, positive parenting has a protective role in the interplay between aggression and CU traits and in the association between community violence and CU traits. The novel finding

that most, and perhaps all, of the effect of CU traits on young children's aggression, is confined to those who are already aggressive, requires replication and further investigation. Further research about the role of parenting on CPs and CU traits must involve additional parenting dimensions to identify those of relevance in children immersed in contexts with differential features, as well as work on the relative importance of positive and negative parenting in CU traits.

Declaration and thesis statement

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Thesis statement

Papers compiled in this thesis, were principally produced together with my PhD supervisor, Professor Jonathan Hill from University of Reading, and my second supervisor, Doctor Nicola Wright, from Kings College London. My specific contribution for each of the four papers included in the present thesis is similar. For the introduction and background sections, I reviewed previous research and theoretical foundations for the different research hypotheses and objectives addressed in each paper (80%). Methods for the Colombian sample were fully completed by trained research assistants from Colombia and me, including participants recruiting, as well as baseline and follow-up assessments (100%). The measurement selection was discussed with my supervisor, and decisions were made based on the WCHADS study previous assessments to make comparisons where relevant. I acquired the Spanish versions of the questionnaires and scales and created the sociodemographic questionnaire and the online version of the measures for the follow-up with authors' approval. Reliability processes for the systems used to code observed measures of parenting dimensions were completed by Colombian research assistants, including me (100%). Data analyses were jointly computed, discussed, and described with my PhD supervisors (60%). Similarly, papers discussion and conclusions were written together with my supervisors (60%).

These papers were fully written during the registration period as a PhD student.

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Chapter 1: Introduction

The present thesis explores the emergence of aggressive and disruptive conduct problems (CPs) in young children, as well as general and culture-specific processes outside Westernised settings. CPs are important because they commonly persist over time and give rise not only to adult antisocial problems but also to a much broader set of psychiatric disorders that includes substance abuse, anxiety, and depression (Odgers et al., 2008). A large volume of research into the early origins of problematic behaviours has been conducted (Bedford, Pickles, Sharp, Wright, & Hill, 2015; Bedford et al., 2017; Hawes, Dadds, Frost, & Hasking, 2011; Wagner, Mills-Koonce, Willoughby, Zvara, & Cox, 2015; Waller et al., 2014; Waller, Hyde, Grabell, Alves, & Olson, 2015). However, most of this research comes from Westernised, so-called High-Income Countries (HICs; World Bank, 2020), and very little from Low-Middle-Income Countries (LMICs) making relevant to examine whether its results can be generalised to other settings.

The study was conducted in Colombia, a South American middle-income country with a population of almost 50 million inhabitants who live in rural (26%) and urban areas (74%), distributed in five regions (Caribbean, Pacific, Amazons, Central and Orinoquia). Each region represents geographical, social, and cultural differences (Ministerio de Ambiente y Desarrollo Sostenible, 2013). The country has been immersed in internal armed conflict for the past 50 years, due to high socio-economic inequality across regions, drug-trafficking, and corruption. Even though the country has signed two peace agreements in the last 20 years (paramilitary in 2003 and FARC guerrilla in 2016), its implementation has been slow, leading to a transformation from rural illegal organisations to urban criminal bands made up of former combatants who have not received proper governmental support (Kaplan & Nussio, 2018). Therefore, Colombia represents a particular social context that impacts the individual, family, and community levels by exacerbating risk factors that could further promote the development of children's antisocial and problematic behaviours.

This research had three main aims. First, to identify whether measures and findings already established in HICs research are also generalised to LMICs with potential variations within the group. Second, to address research questions that have not been examined either in HIC or LMIC settings. Third, to examine whether social risk factors frequently observed in LMICs, particularly exposure to community violence, involve differential processes and effects compared to those seen in HICs. To address these objectives, I established the *La Sabana Parent-Child Study* with 235 parents and their children aged 3.5 years and followed-up at age 5 years (N= 220). Much of the measurement used for this study paralleled that of the UK *Wirral Child Health and Development Study* (WCHADS; Sharp et al., 2012), which also conducted assessments at ages 3.5 and 5 years, so that, where relevant, it was possible to compare the UK and Colombian findings.

This thesis focuses on the role of children's indifference to others distress, characterised in HICs research as 'Callous-Unemotional' (CU) traits (Frick, Ray, Thornton, & Kahn, 2014) in the development of CPs, and the possible contribution of parenting dimensions on both CPs and CU traits. Understanding these different potential associations is key to inform early and tailored interventions, which involves examining whether the currently available work from HICs is relevant to LMICs. Given that CU traits are thought to index to a substantial degree an inherited vulnerability or disposition, similar findings across a wide range of settings might indicate common biological contributions. Four papers, each addressing specific research questions, are included in this thesis.

Paper 1

The study focuses on the contribution of parent-reported positive and negative parenting dimensions in the presence of young children CPs and antisocial behaviours. The Alabama Parenting Questionnaire (APQ; Frick, 1991), previously validated with children between 4 and 8 years old (Hawes & Dadds, 2006), was administrated to parents, mainly mothers, along with the Inventory of Callous-Unemotional traits (ICU; Frick, 2004) and the Child Behaviour Checklist

(CBCL; Achenbach & Rescorla, 2001) to identify children Oppositional Defiant Disorder (ODD) behaviours. We conducted confirmatory factor structure analyses of the ICU and the APQ, as they have not been widely used in studies of young Colombian children, and because studies from HICs have shown differences in the shared variance between the items of the questionnaires across different samples. Both the ICU 24-item and the 12-item versions showed similar internal consistency as in previous studies in HICs (Kimonis et al., 2016). The four-factor model of the APQ (positive reinforcement, parental involvement, inconsistent discipline, and corporal punishment) showed a good fit to the data after items 5, 7 and 14 were removed. However, the correlation between the two positive parenting scales (r= .91) suggested that they were not adequately distinguishable in this sample. Therefore, a three-factor solution including positive parenting, inconsistent discipline and corporal punishment was accepted as the best fitting model and the summed scores were used in the study analysis.

The overarching hypothesis for parenting role was that, in contrast to parental influences for CPs in general, which often occur in the context of negative parenting, the relevant parenting dimensions for CU traits are the positive ones. This level of specificity has rarely been examined before and not previously in young preschool children and in a sample from a LMIC. We conducted hierarchical multiple linear regression analyses to examine whether cross-sectional associations between parenting and CU traits and ODD behaviours were in accordance with the hypothesis. Results pointed out that positive but not negative parenting was negatively associated with CU traits after controlling for ODD. Conversely, negative but not positive parenting was positively associated with ODD behaviours after accounting for CU traits. Results provide support for unique mechanisms for CU traits and ODD behaviours in young children in a LMIC. These findings are presented in the paper titled *Positive and negative parenting, CU traits and ODD behaviours in Colombian preschool children* (Chapter 3), which is in preparation for submission to the Journal of Abnormal Child Psychology.

Paper 2

This study addresses the question of whether the ICU, validated in HICs, is also valid in Colombian children at age 3.5 years. Incremental validity was used to test whether ICU scores at 3.5 years predict childhood aggression at age 5.0 years over and above aggression at age 3.5 years as an independent (main) effect, or by amplifying aggression that was already established. As there is limited evidence about how CU traits create a risk for future aggression, we hypothesise that children who are already aggressive and present increased CU traits are at higher risk for increased and persistent future levels of aggression, probably due to deficits in their mechanisms for inhibiting aggressive behaviours.

Because there is limited evidence either from HICs or LMICs, we used parallel measurement in La Sabana Parent-Child and WCHADS studies to examine findings comparability. The hypothesis that CU traits predict future aggression more strongly in children who are already aggressive was tested in an epidemiological cohort of 687 children from the UK, and a general population sample of 220 Colombian children. The Antisocial Processes Screening Device (APSD; Frick & Hare, 2001) in the UK and the ICU in Colombia were used to capture children CU traits together with the CBCL for aggressive behaviours. Hierarchical multiple linear regressions showed that the association between CU traits at age 3.5 years and aggression at age 5.0 years was stronger in children who were already aggressive at age 3.5 years, compared to those with lower levels of aggression. This paper is particularly informative about the role of CU traits in the development of children's aggressive behaviours that emerged early during childhood. Tailored and early interventions must be prioritised in children presenting both aggressive behaviours and CU traits to prevent future more complex patterns of aggression. Findings are reported in the paper titled *Synergy between CU traits and aggression in preschool children: cross-informant and cross-cultural replication in the UK Wirral Child Health and Development Study, and the Colombian La Sabana Parent-Child Study* (Chapter 4) published in Development and Psychopathology Journal.

Against a background of limited and inconsistent evidence from HICs, the research question for this study is whether observed maternal positive reinforcement and observed warmth and reciprocity -conceptualised as maternal positivity- at age 3.5 years moderate the association between CU traits and aggression at age 5.0 years. Moreover, this study points to identify whether this is stronger in children who are already aggressive. As found in paper 2, the interaction between CU traits and aggression is strongly associated with increased future aggression. Thus, it is hypothesised that positive reinforcement and maternal positivity provide a restraint on aggressive behaviours in children with limited influence of empathy. This hypothesis is novel in both HIC and LMIC settings.

To address these questions, positive reinforcement and maternal positivity were assessed using a standardised observational assessment of parent-child interactions from the National Institute for Child Health and Human Development (Child Agency code from NICHD Early Child Care Research Network, 1999). Parent-child interactions consisted of a 15-minute play procedure, followed by a 3-minute 'tidy-up' procedure. After establishing inter-rater reliability, the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, Nelson, Duke, & Boggs, 2004) was used to code parental positive reinforcement (praise) during the 'tidy-up' procedure, and the Parent-Child Interaction System (PARCHISY; Deater-Deckard, 2000) was used to assess maternal positivity during the play procedure. Overall, results provided evidence that positive reinforcement moderated the association between CU traits and later aggression, and this was confined to children who were already aggressive. These results are reported in the paper titled: *Is the moderating role of maternal praise and positivity in the association between CU traits and later aggression confined to children who are already aggressive? A prospective study in preschool children in Colombia. (Chapter 5)* submitted to the Child Psychiatry and Human Development Journal. This study emphasises in the protective role of positive parenting

dimension in the development of CPs since early childhood.

Paper 4

Considering that Colombia has an increased risk for violent and criminal actions among its communities due to a history of armed conflict and drug trafficking (Unidad para las Víctimas, 2018), this paper addresses whether the exposure to community violence is associated with future antisocial behaviours as argued in previous research with children and adolescents in conflict-affected countries (Fleckman, Drury, Taylor, & Theall, 2016; Mrug & Windle, 2009). Moreover, as part of the study of the contributions of parenting on CU traits, this paper examines whether maternal positivity and maternal praise modify the expected association. The central hypothesis for this study is that maternal positivity and praise have a protective effect in the association between community violence and CU traits. Previous studies have not examined this effect. However, there is evidence for moderation by positive parenting of genetic risk for CU traits (Waller & Hyde, 2017; Waller et al., 2016).

CU traits were measured using the ICU, the PARCHISY was used to assess observed maternal positivity during the parent-child interaction play procedure, and the DPICS for observed unlabelled praise during tidy-up task. Exposure to community violence was examined through items about ‘Fights’ or ‘Assassinations, kidnapping or disappearances’ in the neighbourhood, and direct experiences with ‘Activities of guerrillas or criminal bands’ or being a ‘Victim of forced displacement’ over the past two years. We conducted hierarchical multiple linear regression analysis predicting CU traits to identify the protective effect of positive parenting in children exposed to community violence. Confounds were included in Block 1, maternal positivity, praise, negativity, and community violence in Block 2 to examine main effects, and the interactions between parenting dimensions and exposure to community violence in Block 3. No main effects of parenting nor exposure to community violence were found. A significant statistical interaction between exposure to community violence and maternal positivity was

identified, corroborating the proposed hypothesis of the protective role of positive parenting in the link between community violence and CU traits. Results are presented in the paper *Exposure to community violence and CU traits: the role of positive parenting* (Chapter 6), which is in preparation for submission to the Journal of Child Psychology and Psychopathology. This study contributed evidence about how parental warmth and reciprocity reduce the risk for future antisocial outcomes in young children that are immersed in violent contexts.

In summary, *La Sabana Parent-Child Study* provides a unique set of analyses that evidences general and specific processes related to the presence of CU traits and CPs, and the contribution of parenting. This study presents data collected in a LMIC that has been particularly affected by violence throughout its history. The contributions of this thesis are twofold. The first one, is identifying CU traits in early childhood as a valid construct in a LMIC, as well as its role in the development of aggressive behaviours. These findings create opportunities for designing early interventions aimed at preventing future complex and severe patterns of antisocial behaviours. The second one, is providing evidence regarding the specificity of the contribution of parenting dimensions in the presence of CU traits and CPs in general and informing about the protective role of maternal positivity and positive reinforcement dimensions in children with increased risk for CU traits and aggression who are immersed in violent settings. Therefore, tailored interventions must include the family context, particularly parent-child interactions, as the primary target.

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Chapter 2: Background

This Chapter presents theoretical and empirical bases regarding the study questions and hypotheses addressed in the papers compiled in this thesis. The background covers topics that were not extensively described in the papers due to words length limitations of the journals. First, I describe specific patterns of conduct problems (CPs) that are thought to involve differential underpinning mechanisms. Based on the diverse subtyping forms of CPs, I review how CPs heterogeneity has been previously described, focusing on children presenting CPs with and without Callous-Unemotional (CU) traits.

Second, I present evidence regarding the available measures of CU traits and its psychometric properties and incremental validity. I focus on the description of the inventory of Callous-Unemotional traits (ICU; Frick, 2004) in young children as it is a widely used measure that was included in the present study. This Section concludes by the identification and description of studies of the assessment of CU traits in low and middle- income countries, as this project was conducted with a sample of Colombian families.

Third, I provide an overview of genetic, biological, socioemotional, and environmental processes that have been linked to CPs and CU traits. Regarding environmental contributions, I present a Section about the evidence of the association between parenting dimensions and CPs and CU traits, emphasising on the contribution of positive parenting on CU traits in young children. Then, I describe studies with adoption and twin samples that explore the role of parenting dimensions on CU traits accounting for gene-environment correlations.

Fourth, I show the link between CU traits and CPs based on studies using latent-profile analysis and studies exploring the synergistic effect of CPs and CU traits in later aggression. Subsequently, I describe studies of the modifying effect of parenting dimensions in the association between CU traits and CPs. Since there is limited evidence regarding CU traits outside classified by the World Bank (2020) as High-Income Countries, I report studies from Latin America about the link between parenting practices and children CPs. Finally, I examine

exposure to community violence as a social risk factor for CU traits, which is a phenomenon frequently observed in Low and Middle-income Countries, and the possible protective role of positive parenting dimensions.

It is worth noticing that, in addition to the empirical and theoretical backgrounds of CU traits and CPs, in my role as a clinical psychologist in private practice in Colombia, I identify the persistent need of conducting research about the early origins of problematic and antisocial behaviours. These negative outcomes are highly prevalent in Colombian children and adolescents in comorbidity with problems such as substance abuse, poor academic performance, and affective symptoms. I was very aware of developments in research into the early origins of conduct problems in young children and also that most of it comes from a small number of countries characterised as 'High Income'. I therefore wanted to conduct research which examined whether other findings generalise to Colombia, while at the same time making an original contribution to the field. Studying CU traits for the first time in my country represents an opportunity to approximate to the early understanding of aggression to prevent future more complex behaviours. Contexts involving increased rates of violence, in which almost 50% of Colombian children are immersed, highlight the relevance of identifying the basis of early interventions and preventing programs for CPs. Also, private practice has allowed me to recognise the relevance of parenting dimensions in the exhibition of problematic and antisocial behaviours in young children. In this line, working with parents represents the principal source of treatment, making it relevant to understand how parent-child interactions behave as protective or risk factors for CPs and CU traits.

2.1. Conduct problems and Callous-Unemotional traits: Main evidence regarding specific patterns of conduct problems

This Section presents an overview of the evidence regarding the nature and importance of conduct problems (CPs) in children, discussing heterogeneity and introducing Callous-Unemotional (CU) traits as an essential source of heterogeneity.

Problematic behaviours can persist and escalate over time. As such, repeated tantrums, aggressive and rule-breaking behaviours at around age 2 years commonly persist leading to severe violent and offending outcomes during adolescence and adult life (Postert et al., 2012). The worldwide prevalence of disruptive behaviours in children and adolescents has been estimated to be 5.7% (see Polanczyk, Salum, Sugaya, Caye and Rohde meta-analysis in 2015), a problem that entails negative consequences not only directly to the children but also their families and communities (Rivenbark et al., 2018). Therefore, CPs constitute a public health concern that leads to social and economic adverse effects (Waller et al., 2016a). Without treatment, these behaviours may escalate to severe antisocial outcomes (Colman et al., 2009), highlighting the importance of understanding the early origins of problematic behaviours for designing preventive programs and tailored interventions (Dishion et al., 2008). While early onset CPs shows distinctive trajectories that might imply homogeneity increasingly, it is clear that there is considerable heterogeneity which needs to be identified and understood in order to investigate its associated causes and maintenance factors (Waller et al., 2019).

2.1.1. Conduct problems heterogeneity

CPs involve early manifestations of a wide variety of problematic behaviours including aggression, opposition, defiance, rules disregard, anger, and irritability (Frick & Viding, 2009). Children and adolescents' problematic behaviours have been described in previous research using different constructs like 'disruptive behaviour', 'problematic behaviour' or 'conduct problems'. For this thesis, the term CPs will be used to refer to negative behaviours that can be observed since early childhood, including aggressive and oppositional and defiant behaviours.

CPs can be identified in children since age 2 years or even earlier (Merikangas, Nakamura, & Kessler, 2009) with distinctive pathways regarding the age of onset and course (Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Tremblay, 2010). Early manifestations of CPs predict serious offences such as assault, robbery, domestic violence, corporal punishment towards children and other forms of abusive (Frick, 2016a) and antisocial behaviours (Hill & Maughan, 2015; Mills-Koonce, Willoughby, Garrett-Peters, Wagner, & Vernon-Feagans, 2016) underlining the importance of understanding the earliest developmental origins of CPs as the basis for early interventions (Frick, 2016b).

While these findings indicate considerable commonality across conduct problems, considerable attention has been paid to the possibility that there is heterogeneity in the patterns of behaviour in which case there may be distinctive developmental pathways into these problems (Fanti, 2018; Fanti & Henrich, 2010). The approach to CPs heterogeneity, relevant for the present thesis, is by the presence of callousness and lack of empathy. In adults, this is characterised as 'psychopathy', and in children by analogy as 'Callous-Unemotional (CU) traits'. Variations in behavioural patterns are observed in children with both CPs and CU traits, compared to children exhibiting CPs in general (Frick & White, 2008). The next Sections present a review of studies of CU traits and their role in CPs.

2.1.2. Callous-unemotional traits

Antisocial adults with psychopathic traits are more violent compared to antisocial adults without these traits, and their problems are more persistent (Azevedo, Vieira-Coelho, Castelo-Branco, Coelho, & Figueiredo-Braga, 2020). Studies of children have examined possible childhood equivalents of psychopathy such as lack of remorse, absence of empathy for others' distress, fearless, uncaring attitudes, and lack of concern about the consequences of one's misbehaviour in the development of CPs (Frick, Ray, Thornton, & Kahn, 2014). These characteristics, termed CU traits, are also defined as a "multidimensional construct encapsulating

the presence of callous (low empathy), uncaring (low prosociality) and remorseless (low guilt) behaviours" (Waller et al., 2019a, p. 13).

As in adults, children with CPs who also have elevated CU traits differ in many aspects from children exhibiting only CPs (Frick & White, 2008; Frick et al., 2014). Children with CPs and CU traits present severe, chronic, and highly stable violent and aggressive behaviours (Obradović, Pardini, Long, & Loeber, 2007; Rowe et al., 2010) and may show a limited response to conventional parent-training interventions frequently used to treat CPs (Hawes, Price, & Dadds, 2014; Herpers, Rommelse, Bons, Buitelaar, & Scheepers, 2012). To identify those children at higher risk for future severe and chronic negative outcomes who are less responsive to CPs treatments, the 5th edition of the DSM and the International Classification of Diseases (ICD-11; World Health Organization, 2018) included CU traits as a specifier of conduct disorders. This specifier termed ´*Limited Prosocial Emotions*´ involves four characteristics: lack of remorse or guilt, callousness–lack of empathy, lack of concern about performance in activities and shallow or deficient affect. Since this specifier is useful for the early identification of intricate patterns of negative conducts, Longman, Hawes and Kohlhoff (2016) suggest that it must be considered not only for disruptive behaviour disorders as indicated by the DSM-5 and the ICD but also for different forms of CPs such as ODD and aggressive behaviours, as considered in the present thesis.

2.2. The measurement of CU traits

In this Section, I present a review of preceding studies about the measures of CU traits that are frequently used in samples of children and adolescents in HICs. Then, I present studies examining the validity and psychometric properties of the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004), an extensively used measure of CU traits. Finally, I present an overview of studies exploring the psychometric properties and incremental validity of CU traits measures, mainly in samples of preschool children.

CU traits are widely measured in children from reports provided by adults, usually mothers and fathers for preschool children, and for school-aged children by teachers. Different measures to capture CU traits are described in previous research, such as the Antisocial Processes Screening Device (APSD; Frick & Hare, 2001), the ICU and, more recently, the Child Problematic Traits Inventory (CPTI; Colins et al., 2014). Several studies of preschool children have used a shortened version of the Child Behaviour Checklist (Achenbach & Rescorla, 2001) to assess CU traits, composed by a 5-item scale (Willoughby, Waschbusch, Moore, & Propper, 2011).

The APSD and the ICU are extensively used in research of CU traits in children and adolescents (Clark & Frick, 2016; Hawes, Dadds, Frost, & Hasking, 2011; Mills-Koonce et al., 2016; Pardini, Lochman, & Powell, 2007; Wagner, Mills-Koonce, Willouby, Zvara, & Cox, 2015). Both measures include the identification of uncaring behaviours, absence of guilt and remorse after misbehaving, as well as prosocial and empathic outcomes, capturing the affective dimension of psychopathy in this population (Ray & Frick, 2018). The APSD comprises 20 items scored on a 3-point scale (0= not at all true, 1= sometimes true, and 2= definitely true), which inform about three subscales relevant to understand psychopathy: CU behaviour (shallow emotions and guilt), impulsivity and narcissism, and also provide a total score. Three forms of the APSD are available: parent, teacher and adolescent self-report. The APSD was initially developed for school-aged children. However, some studies have included this measure in

studies with young children (Dadds, Hawes, Frost, & Fraser, 2005; Kimonis et al., 2006; Pasalich, Dadds, Hawes, & Brennan, 2012).

Kimonis and collaborators (2008) informed some limitations of the APSD CU subscale, which likely contribute to the poor internal reliability of the scale, that were later addressed in the ICU. This includes a limited number of dissimilar items to identify CU traits and a 3-point scale that limits the response options. For the ICU, four items reflecting the limited prosocial specifier of the APSD were used along with additional items. The ICU is largely used in studies of CU traits in children and adolescents, and recently in young children (see Section 2.2.2). Self-report, parent-report and teacher-report forms of the ICU are also available, all composed by 24 items that inform the extent to which certain behaviours are presented in children. In this thesis, the focus is on the parent-report version of the ICU.

2.2.1. Validity and psychometric properties of the Inventory of Callous-unemotional traits

Although the ICU was created as a total scale to assess CU traits, previous research in older children and adolescents exploring the factor structure of the inventory (Ciucci, Baroncelli, Franchi, Golmaryami & Frick et al., 2014; Kimonis et al., 2008; Waller, Hyde, Grabell, Alves, & Olson, 2015) supports a bifactor model that includes the total score and three dimensions with different correlates: *Callousness*, reflecting the lack of empathy and guilty; *Uncaring* about others emotional responses and one's performance; and *Unemotional,* which captures shallow affect. A meta-analytic review provides evidence about the high internal consistency and validity of the ICU total score, as well as callousness and uncaring dimensions across different samples (Cardinale & Marsh, 2020). By contrast, this review informs validity concerns about the unemotional dimension, which often fails to demonstrate associations with externalised problems, compared with the uncaring and callous dimensions which are significantly associated with these problems (Kimonis et al., 2016). This has led some authors to question whether the items included in the scale adequately assess unemotionality as it is conceptualised in the CU traits construct (Waller et al., 2015b; Haws et al., 2014).

Psychometric concerns regarding the unemotional dimension of the ICU were summarised in a recent meta-analysis that included 146 studies using the ICU (Deng et al., 2019). Authors stated that the low average internal reliability score of this dimension is probably associated with the small number of items that it comprises and because some of them examine different constructs at the same time. Also, this review indicated that variability of the alpha coefficients across the studies was explained by the study's characteristics, such as the implemented form (lower for self-reported) and participants age (higher for children) (Deng at al., 2019).

Ray, Frick, Thornton, Steinberg and Cauffman (2016) examined reasons for bifactor solutions for the factor structure of the ICU. Authors identified that separated factors are obtained probably because the ICU comprises positively and negatively worded items. These items reflect different severity of the assessed manifestations, as such negatively worded items inform about less severe symptoms, whereas positively worded items reflect more severe ones that are strongly correlated with antisocial and aggressive scores. Consequently, Ray and Frick (2018) encourage the use of the ICU 24-item total score as the inventory does not assess separate constructs and has obtained good internal consistency (e.g., α= .81, Deng et al., 2019; α= .87, Waller et al., 2015b; α= .84, Waller, Hyde, Klump, & Burt, 2018).

When the factor structure of the ICU has been examined in preschool or school-age samples using the parent-report, the bi-factor structure has generally not been replicated (Willoughby, Mills-Koonce, Waschbusch, Gottfredson, & Family Life Project Investigators, 2015; Ezpeleta, Granero, de la Osa, Penelo, & Domènech, 2013; Hawes et al., 2014a; Houghton, Hunter, & Crow, 2013, but see Waller et al., 2014). Three studies have suggested two correlated factor structures in samples of children and adolescents, with one retaining all the 24 items from the scale (Willoughby et al., 2015) and two others retaining items mainly from the callous and uncaring dimensions consistent with concerns regarding the unemotional dimension of the scale (Hawes et al., 2014a; Houghton et al., 2013). Hawes et al. (2014a) two-correlated

factor structure was replicated with a sample of 3 years olds (Kimonis et al., 2016), showing good internal consistency as a 12-item total (α= .85; Hawes el at., 2014a).

2.2.2. Validity and psychometric properties of CU traits measures in preschool children

Measuring CU traits in young children entails challenges due to the developmental processes occurring during this period. At ages 2 and 3 years, children's cognitive skills, conscience development and behavioural inhibition mechanisms are still maturing (Hyde et al., 2013), making difficult to identify whether certain behaviours reflect developmental immaturity or CU traits. After age 3, most of these processes are settled, suggesting CU traits could be reliably measured in children from this age onwards (Kimonis et al., 2016). Below, I outline studies regarding ICU psychometric properties in this population, together with studies using the APSD, and a comprised measure of CU behaviours. Additionally, a review of predictive validity of some of these measures is presented.

Despite the relevance of the early identification of CU traits to prevent the future exhibition of more complex and adverse outcomes, CU traits have received limited attention among young children. Only few studies about the psychometric properties and validity of measures of CU traits during the preschool period are available. A sample of 49 high-risk children in the USA between age 2 and 5 years participated in a cross-sectional study that used the APSD parent and teacher-reports (Kimonis et al., 2006). The APSD in this study presented low internal reliability (.54), lower than reported in studies of older children, but evidenced validity in relation to aggression assessed prospectively one year later. Dadds et al. (2005) used the APSD with a sample of 4-6 years old children and reported similarly low Cronbach's Alpha (.55), which they improved by supplementing with items from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) prosocial subscale (.79). They found this supplemented CU traits scale predicted antisocial behaviour prospectively assessed one year later but only in interaction with baseline antisocial behaviour.

Regarding the ICU, Ezpeleta, Granero, de la Osa, Panelo and Domènech (2013) carried out a longitudinal study with 1.341 families (66.4% low and middle-income families, 51% boys) to explore its psychometric properties in a sample of Spanish preschool children (M= 3.0, SD= .18). The teacher-report form was completed at ages 3 and 4 years showing good internal reliability (.89 and .93 respectively). The authors were unable to replicate the bi-factor structure reported from studies of older children and adolescents, and instead accepted a three-correlated factor structure. Kimonis and colleagues (2016) examined the factor structure and psychometric properties of the ICU 24-item in a sample of 214 preschool children in the USA (M= 4.7, SD= 0.69, 52% were boys and families were mostly from low-income settings). The sample included 45 children with elevated CU traits (M= 34.47, SD= 11.02) and 169 children with mainstream scores (M= 26.15, SD= 11.25). The authors found that the same two-correlated factor structure proposed by Hawes et al. from a sample of school age children showed the best fit to the data (callousness and uncaring), evidencing good internal consistency (α= .85). They conducted analysis examining the validity of both the 12-item and the full 24-item total and found similar results.

Recently, a measure of psychopathic traits, which contains a CU scale, was developed for children aged 3-5 years. The Child Problematic Traits Inventory comprises three dimensions assessing callous-unemotional traits, grandiose-deceitfulness and impulsiveness/need for stimulation, all showing good internal consistency (α= .95, .91, and .92 respectively; Colins et al., 2014) and a total score (α= .96). Also, cross-sectional evidence for the validity of the scale and subscales in relation to aggression in cross-sectional analysis has been provided (López-Romero et al., 2019).

The most frequently used approach to assess CU traits in preschool children has been to generate scales using items from existing child problem behaviour measures. Willoughby et al. (2011) developed a five-item CU traits scale using the Child Behaviour Checklist (Achenbach & Rescorla, 2001). They used confirmatory factor analysis to test a three-factor model with the

ODD and ADHD subscale items, demonstrating that the CU traits scale was separable from these other child problem behaviour dimensions. This three-factor structure has been replicated in different samples of children at age 3 years (Waller et al., 2015b; Willoughby, Mills-Koonce, Gottfredson, & Wagner, 2014). Internal consistency for this five-item scale is generally low (.65, Waller et al., 2015c; .55, Willoughby et al., 2011; .55, Willoughby et al., 2014). Prospective evidence for the validity of the CBCL based measure in relation to teacher-reported externalising behaviour or aggression at school age has been reported in three independent samples (Waller et al., 2014; Waller et al., 2017), providing evidence for the incremental validity of the 3-correlated factors of CU traits to predict future externalising symptoms.

Waller, Hyde and colleagues (2012, 2014 and 2015b) used exploratory (EFA) and confirmatory factor analyses (CFA) to generate a CU traits scale for children at ages 2-4 years based on three existing scales, the CBCL, the Eygberg Child Behaviour Inventory (ECBI; Robinson, Eyberg, & Ross, 1980) and the Adult-child Relationship Scale (ACRS; Pianta, 2001). They conducted EFA and CFA at each age and retained items that showed acceptable factor loadings across the three time points, which did not include two items used in the other CBCL based CU measure ("Shows little affection" and "Unresponsive to affection"). The scale was labelled '*deceitful-callous*' behaviour as it included an item assessing lying, which showed moderate to acceptable internal reliability, improving at each age (ages 2= .57, 3= .64, and 4= .72).

A study in the UK used EFA and CFA on a sample of young children to generate a CU traits scale with acceptable psychometric properties from the APSD CU traits scale, the CBCL and the Brief Infant-Toddler Social Emotional Assessment (BIT-SEA; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004) at ages 2.5 and 3.5 years and the SDQ at age 5 years. The same items considered by Willoughby et al. (2011) and Hyde et al. (2013) from the CBCL, and by Dadds et al. (2005) from the SDQ (with a similar item from the BITSEA used at the earlier ages as the SDQ was not available then) were entered into an EFA with the APSD CU subscale

at each age. Items showing acceptable loadings were retained and allowed to differ at each age point developmental differences in the manifestation of CU traits. At each age, two correlated factor CFA's were tested with aggressive behaviour, and measurement invariance across sex was achieved (Wright, Hill, Sharp, & Pickles, 2018; Wright, Sharp, Pickles, & Hill, 2020). The scales showed acceptable internal consistency (age 2.5= .72, and age 5= .83).

A widely used test of the validity of measures of CU traits entails examining whether, in a prospective design, CU traits predict later aggression or CPs after controlling for baseline aggression or CPs. This '*incremental validity*' tests the distinctive contribution of CU traits to the emergence of CPs. Studies of preschool children have provided support for validity, based on the incremental prediction of CPs over time after accounting for baseline CPs. In the longitudinal study of Waller et al. (2015b) parent-reported CU traits assessed at age 3 years predicted higher teacher-reported externalising problems at age 6 years after accounting for age 3 years externalising behaviours. Similarly, Hyde et al. (2013) found that their deceitful-callous measure at age 3 years predicted age 4 CPs after accounting for age 3 CPs.

Neither of these studies used purpose design measures of CU traits and few studies of incremental validity have used measures widely used in older children either the APSD or ICU. Using the APSD with items added from the CBCL to deal with low internal consistency, Wright et al. (2020) showed that CU traits measured at age 2.5 years predicted age 5 years aggression within a cross-lag auto-regressive model after accounting for age 2.5 years aggression, and the auto-regressive associations between age 2.5 and 5 years CU traits and aggression but in girls only.

All studies of the incremental validity of CU traits that I was able to identify have been conducted in HICs, raising the question of its validity in LMIC settings, which represent different socio-cultural and socio-economic characteristics. Paper 2 (Chapter 4) is the first study of incremental validity of the ICU in preschool children in a LMIC.

2.2.3. The assessment of CU traits in LMIC settings

Very little is known about CU traits outside of HIC settings. A search in PubMed using the term '*Callous-Unemotional traits'* yielded 720 publications of which 11 (2%) were from outside of HICs. Consequently, evidence is limited regarding the psychometric properties and the validity of established CU traits measures outside of HICs. A small number of studies in LMICs have used established measures of CU traits. Studies of the self-report version of the ICU in adolescents in South Africa (Nwafor, Ibeagha, Anazonwu, & Obi-Nwosu, 2019; Nwafor, Onyeizugbo, & Anazonwu, 2015) and Mexico (Amador, Fernández, Galvan, Resendiz, & Padrós, 2017; Amador & Padrós, 2019) have reported similar but somewhat lower internal reliability, and similar levels of CU traits to those from HICs. Additionally, Nwafor and colleagues (2019) provided evidence for the validity of the ICU in relation to aggression and bullying behaviours in a sample of adolescents. These studies have explored the psychometric properties of the ICU but did not test the factor structures previously informed in studies from HICs. Instead, some of them tested a three-correlated factor structure (Nwafor et al., 2015) and used EFA to develop a revised shorter scale (Amador et al., 2017).

The factor structure of both the self- and parent-report ICU versions has been examined in a number of studies from China. Wang et al. (2019) tested competing factor structures of the parent, teacher and self-report versions of the ICU proposed from HICs in a sample of children at ages 6-12 years (N= 977) and tested longitudinal measurement invariance. They found a two correlated factor 11-item version as the best fitting structure based on Hawes et al. (2014a) but excluding one item from the unemotional subscale. Consistently, two recent studies of Chinese samples, one with detained adolescents (Zhang et al., 2019) and one with university students (Wang et al., 2017) found that the 11-item solution had the best fit. Zhang et al. suggested that the unemotional scale may have less relevance in Chinese culture where emotional expression is less encouraged compared to Western cultures. Also, they provided evidence for the validity of this version since associations with aggression where identified. Later, the factor structure of this

version was tested in a cross-cultural study in the UK (age 11-14 years) and Chinese (age 10-13 years) children (Allen, Shou, Wang, & Bird, 2020). The study concluded that the 11-item scale showed the best fit in the UK sample, and showed weak cross-cultural measurement invariance.

This PhD study provides further evidence of the psychometric properties of the ICU in a sample of young children from a LMIC setting. Specifically, we examined the ICU factor structure by testing results from previously studies from HICs (Paper 1, Chapter 3) and its incremental validity (Paper 2, Chapter 4).

2.3. Genetic contributions to CU traits and the contrast with genetic influences on conduct problems more broadly

There is evidence of moderate to strong genetic influences on all CPs. However, this evidence indicates that genetic influences on CU traits may be stronger than for CPs more broadly, with heritability rates that fluctuate between 36% and 67% (see Polderman and colleagues review, 2015 and Viding, Blair, Moffitt, & Plomin, 2005). Studies of parenting therefore must be interpreted cautiously because associations between parenting quality and child CU traits may arise from gene-environment correlations. Genetic designs, such as adoption and twin studies, account for this association and are further described in Section 2.5.4 of this thesis. Although, as described, later exposure to community violence is not random but associated with family characteristics, studies of the effects of community violence may be less prone to genetic confounding.

2.4. Biological and socioemotional processes in CU traits

CU traits link to specific biological and personal processes may provide pointers to key aspects of parenting that may influence CU traits development. This Section briefly describes biological and social deficits that have been found to contribute to children increased risk for CU traits. Evidence from previous studies in this regard is presented. Developmental research argues that during preschool years children's socioemotional development emerge, involving empathic (Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008) and prosocial behaviours (Brownell, 2013). Waller and collaborators (2019) indicated that prosocial behaviours are consequence of empathy development as it increases children's intention to support others after recognising cues of distress. This developmental process relies on the appropriate identification of others' emotional expressions (Blair, 2013a).

A relevant developmental pathway to low empathy has been proposed which envisages reduced eye contact impacting on parent-child interactions and hence inhibiting the growth of empathy (Dadds et al., 2014). A study in this regard found that children with CU traits make less eye contact with parents than other children, and instructions to make eye contact improve emotion recognition in children with CU traits, informing about the causal role for reduced eye contact (Dadds et al., 2012). Earliest contributions from reduced social engagement showed that infants at age 5 weeks with reduced following of the human face compared to an inanimate object, had higher CU traits at age 3.5 years (Bedford, Pickles, Sharp, Wright, & Hill, 2015). In a further study, Bedford and colleagues (2017) assessed infant gaze towards mothers at age 6 months and CU traits at age 7 years and found that low eye gaze predicted higher CU traits but only in the presence of low maternal sensitivity.

The implication of these findings may be that reduced eye contact during infancy leads to fewer positive parent-child interactions involving reciprocity. In turn fewer positive responses from a parent may further reduce reciprocity giving the child fewer opportunities for eye contact and hence for the development of empathy (Billeci et al., 2019; Blair, Leibenluft, & Pine, 2014)

and the use of punitive practices (Dadds & Salmon, 2003; Fanti, Panayiotou, Lazarou, Michael, & Georgiou, 2016).

2.5. Environment influences on children's development

"Much of the emphasis in this PhD is on establishing whether measurement of child and family dimensions developed in HIC settings is applicable in Colombia, and whether mechanisms identified in HIC settings apply in this LMIC setting. This is important as a basis for investigating possible cross-cultural differences in children's socialisation involving differences in the role of familial and cultural factors. For instance, Fuller and García Coll (2010) pointed out relevant aspects regarding how situational and universal factors mediate child development in the context of Latino families. They provided evidence about differences in the way that families promote children's socialisation processes and cognitive development across Western and Latino settings, and how this is permeated by the culture. Particularly, family has a relevant role as parents' daily life routines and normative behaviour enhances the children sense of membership and social rules internalisation, which are first observed and then replicated by them (Vygotsky's sociocultural theory). Additionally, Fuller and García Coll describe how families meet external factors they need to adapt to or tackle to support children development and described how Latino parents positively face challenges linked to poor environments such as insecurity and violence.

In this line, Vélez-Agosto, Soto-Crespo, Vizcarrondo-Oppenheimer, Vega-Molina and García Coll (2017) describe how culture is inserted in daily routines in which human development takes place. For this reason, it is relevant approaching to cultural features when studying human development as this study proposed by identifying community violence, which frames specific cultural practices. Contrary to the idea that human development is affected by proximal and distal systems (as understood from Bronfenbrenner's bioecological theory), Vélez-Agosto et al. propose that culture is not a separate layer from individual aspects but "a product of human activity" (p. 423). Also, authors propose that culture is changing and dynamic and compresses community social practices and relationships among their members (e.g., families, educational contexts, neighbourhoods). Therefore, authors point out that "culture is what binds

together the various institutions, through the creation of communities of practice that the child participates in or is a part of" (p. 906).

Differences in the way daily routines are display across LMIC families compared with other settings might lead us to expect that mechanisms explaining children's outcomes, as those of relevant for the present study, would differ across these settings. Also, parenting in the Latino setting may be particularly important in the face community violence, which is a persistent phenomenon in LMIC. Following up the observations of Fuller and Garcia Coll that "recent discoveries reveal the resilient strengths of Latino parenting, even among families in poor neighbourhoods" (p. 560), this PhD examined the role of positive parenting for children of families exposed to community violence in Colombia. Differences in the way daily routines are display across Latino families compared with other settings might lead us to expect that mechanisms explaining children's outcomes, as those of relevant for the present study, would differ across these settings. Also, parenting in the Latino setting may be particularly important in the face community violence, which is a persistent phenomenon in LMIC. Following up the observations of Fuller and Garcia Coll that "recent discoveries reveal the resilient strengths of Latino parenting, even among families in poor neighbourhoods" (p. 560), this PhD examined the role of positive parenting for children of families exposed to community violence in Colombia".

2.6. Environment influences on CU traits and the contrast with environmental influences on CP: focus on positive and negative parenting

This Section presents evidence on the associations between parenting practices and CU traits and CPs. Studies reporting specific associations between positive parenting dimensions and lower CU traits are described, together with possible mechanisms in which these dimensions operate. From this perspective, the main role of parenting is protective. Given the focus of this study, more detail is provided regarding the evidence of this association among young children.

Early studies suggest that CU traits are not strongly associated with negative family environments (Hill, 2002) as CPs are. One possible explanation is that environmental influences do not play a large part in causing CU traits. That would be consistent with the evidence from twin studies of higher heritability for CU traits than for CPs. An alternative explanation is that some children are predisposed to develop CU traits, and that vulnerability is decreased by positive parenting (Henry et al., 2018; Waller et al., 2018, see Section 2.5.4). This leads to the hypothesis that positive parenting will be associated with lower CU traits but not lower CPs and that, conversely, negative parenting will be associated with elevated CPs but not elevated CU traits (Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011; Pasalich, Dadds, Hawes, & Brennan, 2011).

The next Sections review hypotheses for the role of positive parenting in CU traits, as well as a brief analysis of the evidence on its role in school age children, followed by a more detailed review of studies of preschool children, which is the focus of the present study.

2.6.1. Hypothesised contributions of positive parenting to CU traits

Studies on CU traits have explored the contribution of positive parenting on its presentation. As described above, results indicate that specific aspects of positive parenting are associated with lower levels of CU traits (Centifanti, Meins, & Fernyho, 2016; Clark & Frick, 2016; Hawes, Dadds, Frost, & Hasking, 2011; Wagner et al., 2015). The mechanisms in which positive parenting operate in children with higher CU traits are following described, emphasising

on the relevant parenting dimensions for the present study: parental warmth, parental involvement, and positive reinforcement.

Parental warmth. Hawes et al. (2011) describe that parental warmth constitutes the affective component of positive parenting. This dimension is considered a precursor in the development of socioemotional characteristics in children, and it has been associated with decreased levels of CU traits in both young children (Pardini et al., 2007; Waller et al., 2014) and adolescents (Kimonis, Cross, Howard, & Donoghue, 2013). Specifically, warm parenting influences children's development of empathy, guilt, and prosocial behaviours (Cornell & Frick, 2007; Kochanska, 1977). Conversely, low levels of warmth increase the risk for CU traits by negatively intervening in children's development of empathy and sensitivity (Waller et al., 2018).

Kochanska and Aksan (2006) pointed out that the development of primary and complex emotions in early childhood is affected by parental warmth. Specific studies regarding its role stated that it fosters the development of conscience and prosocial emotions such as empathy and guilt. Warm parenting is believed to enhance learning and internalisation processes of social norms and prosocial behaviours in children (Clark & Frick, 2016). Correspondingly, Eisenberg, Spinrad and Knafo-Noam (2015) suggest that parental warmth helps the children to internalise parental cues about empathic and prosocial behaviours by promoting child's emotional expressions.

Warm parenting also enhances interpersonal relationships by adopting emotional responses and attachment, and by the recognition of other's signs of distress. Pasalich and colleagues (2012) proposed that warmth and affective interactions positively influence socialisation processes in children with increased CU traits. Warm parenting is also related to increased empathic responses in children, which is relevant for responsiveness to other's distress and the prosocial conceptualisation of relationships (Kiang, Moreno, & Robinson, 2004; Laible & Thompson, 2002).

Parental involvement. Pleck (2010) defined parental involvement as a complex construct that embraces different positive dimensions of parenting as warmth, engagement and responsiveness. Involvement is thought to contribute on CU traits by prompting the internalisation of prosocial interactions and in the development of children's identification and responsiveness to others' signals of distress (Waller et al., 2014). Also, parental involvement fosters positive and warm parent-child interactions (Frick et al., 2003). Laible and Thompson (2002) showed that parental involvement also prompts children's understanding of the relevance of emotionally based social interactions and to reinforce them. In this line, Dadds and colleagues (2012) indicated that parental involvement increases parent-child social interactions providing more opportunities for eye contact.

Even though different studies include parental involvement as a predictor for decreased CU traits (Clark & Frick, 2016; Waller et al., 2018) and report direct and unique associations (Hawes et al., 2011), little is known about the specific mechanism in which this parenting dimension operates. This limitation can be related to the fact that previous studies on CU traits merge parental involvement with other dimensions to obtain a measure of warmth. For example, Pardini and colleagues (2007) merged aspects of parental involvement and positive reinforcement for a general measure of warmth/involvement. Also, in the study of Wallet et al. (2012), they merged aspects of involvement, positive reinforcement, and engaging interactions. Compressing different aspects of positive parenting is in line with Pleck's (2010) approach to parental involvement. Nevertheless, as Clark and Frick (2016) suggested, studies about the specific aspects of parenting that contribute specifically to CU traits are needed to propose targeted prevention and treatment strategies.

Positive reinforcement. This dimension refers to the rewards that parents provide to their children to increase positive behavioural manifestations. As children with higher levels of CU traits are thought to be less sensitive to the use of punishment (O'Brien & Frick, 1996), it has been proposed that parenting focusing on positive reinforcement encourages reward-oriented

responses and inhibits negative behaviours and are of particular importance in the presence of CU traits (Clark & Frick, 2016). Positive reinforcement may be relevant not only to reduce CU traits but also to reduce aggression or CPs in children with increased CU traits. Children with high CU traits who do not regulate aggression on the basis of empathy, may be able to reduce aggression on the basis of reinforcement for prosocial behaviours.

In the present study, associations between positive parenting dimensions and CU traits and CPs are examined in Papers 3 and 4. These papers address the question of the protective role of positive parenting in the expected associations between CU traits and future aggression (Chapter 5), and between the exposure to community violence and later CU traits (Chapter 6). Theoretical accounts suggest that positive reinforcement may reduce antisocial behaviours in children with CU traits by capitalising on their reward-dominant response style (Reidy et al., 2017), and that warm and responsive parenting may reduce antisocial behaviour by fostering social norm internalisation and compliance (Clark & Frick, 2016; Frick et al. 2014; Henry et al., 2018). The next two Sections present a description of studies exploring the association between positive parenting and CU traits in school-age and preschool-age children.

2.6.2. Evidence regarding the association between positive parenting dimensions and CU traits in school-aged children

As reviewed earlier, there are good reasons to propose that the lack of positive parenting rather than the presence of negative parenting, creates vulnerability to CU traits (Hawes, Dadds, Brennan, Rhodes, & Cauchi, 2013). Direct associations between parenting dimensions and CU traits in children have been examined. However, the available evidence is not conclusive, with contradictory findings from cross-sectional and prospective studies examining associations.

Clark and Frick's (2016) cross-sectional study hypothesised that dimensions of positive parenting, but not negative ones are associated with CU traits after controlling for CPs. To test this hypothesis in a sample of 92 children between 4.6 to 7.2 years old, negative and positive dimensions of parenting were measured. The study included the Alabama Parenting

Questionnaire (APQ; Frick, 1991) for inconsistent parenting, corporal punishment, positive reinforcement and parental involvement, the Parent Feelings Questionnaire (PFQ; Deater-Deckard, 1996) and the Parent-Child Communication and Cooperation (PCCC; Hyde et al., 2013) for positive and negative parenting. To capture ODD symptoms, they used the Disruptive Behaviour Disorder Scale (DBD; Pelham, Gnagy, Greenslade, & Milich, 1992) and the ICU parent and teacher reports for CU traits. Gender and ethnicity were included as covariates in simultaneous multiple regression analyses. Results showed that parental warmth, positive reinforcement, and parent-child cooperation/communication were associated with lower CU traits, and the contribution of parental warmth remained significant after controlling for ODD. The authors discussed that positive reinforcement might be relevant in children with CU traits by reducing adverse outcomes as a response to rewarding parental style. This study adds to the identification of different mechanisms in which positive and negative parenting influences CU traits in children. Also, it contributes evidence about specificity of parenting dimensions on CU traits, as the authors accounted for ODD in the analyses. Paper 1 of the present thesis used a similar approach to identify results replicability in a LMIC setting (Chapter 3).

Hawes and colleagues (2011) identified specific contributions of different parenting dimensions on CU traits in a study of 1008 children between ages 3 and 10 years. They used the APQ for parenting, the APSD with items from the SDQ for CU traits and the SDQ for ODD symptoms. Covariates in this study were gender, age, single-parent status, maternal educational level, and household income. Linear and hierarchical regressions were carried out for each parenting scale from the APQ. Parental involvement, positive parenting and poor monitoring predicted future changes in CU traits. This association was moderated by age and gender, where positive parenting was more significantly associated for girls, whereas parental involvement was more relevant for boys. It is worth noting, however, that the measure used to capture CU traits is composed of items from different scales that have not been widely used in other studies.

Prospectively, evidence for specificity in a sample of 891 school-age children (M= 6.5, SD= .48) is provided from the Fast-Track study (Pasalich, Witkiewitz, McMahon, Pinderhughes, & Conduct Problems Prevention Research Group, 2016). Based on a cross-sectional design, the study used parent-reported measures of the APSD to capture CU traits, parental interviews for CPs and parental harshness, and the Interaction Rating Scales (Crnic & Greenberg, 1990) to identify parental warmth. Structural and indirect effect models showed that parental warmth accurately predicted CU traits in early adolescence after controlling for CPs, whereas parental harshness predicted only CPs. Predictions on CU traits from positive parenting did not account for negative parenting and vice versa, a limitation for the identification of specificity in the contribution of parenting dimensions on CU traits.

Pardini et al. (2007) study with 120 children at age 9 and then at age 12 years used the APQ to assess parent-reported warmth/involvement by adding the scores from parental involvement and positive reinforcement scales. Also, using the APQ, they explored negative parenting dimensions of corporal punishment and inconsistent discipline. CU traits were captured using the APSD parent and teacher reports, each with acceptable reliability (.71 and .75). Measures of CPs using the Behaviour Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) were also included for specificity on CU traits. Linear regressions showed that decreased levels of corporal punishment and increased levels of parental warmth/involvement predicted lower CU traits, though positive parenting also predicted decreased CPs. Since the authors did not control for negative parenting when exploring contributions of positive dimensions, specificity for positive parenting on CU traits was not examined in this study.

The longitudinal study by Barker, Oliver, Viding, Salekin and Maughan (2011) used maternal reports of harsh and warm parenting in children at age 2 years, the SDQ for CPs at ages 7, 10 and 13 years, and a 6-item questionnaire (Moran, Ford, Butler, & Goodman, 2008) for CU traits at age 13 years. Prenatal risk during pregnancy and children's fearless temperament at age

2 years were also included in Structural Equation Modelling (SEM) to examine predictions from warm and harsh parenting on CU traits in girls and boys (51%) after accounting for the association between CU traits and CPs. Results showed that decreased levels of warmth moderately predicted CU traits in girls, whereas harsh parenting predicted CU traits specifically in boys. Information regarding the internal reliability of the measure for CU traits was not reported in the study, which is one of the limitations of this study as this measure has not been widely used in previous studies.

2.6.3. Evidence in preschool children regarding the association between parenting dimensions and CU traits

As discussed in Section 2.1, it is key to identify the early origins of CU traits, especially the contribution of parenting, to inform early interventions aimed at decreasing the risk for antisocial outcomes in adolescence and adulthood (Frick, 2016b). Findings from the *Wirral Child Health and Development Study* (WCHADS) indicate that early positive parenting is associated with lower CU traits (Bedford et al., 2015; Wright et al., 2018). Using data derived from the Child Agency code from NICHD Early Child Care Research Network (1999) play procedure at 29 weeks, Wright and colleagues (2018) showed that maternal positivity and sensitivity to distress predicted CU traits assessed over 2.5, 3.5 and 5 years. Parental negativity, assessed as intrusiveness, did not predict CU traits and the effect was not mediated via attachment status at 14 months.

Centifanti et al. (2016) found that mind-mindedness, indexing the mother's awareness of her infant's states of mind at age 8 months, predicted children's self-report of CU traits at age 10 years. Parental sensitivity over the preschool period was also associated with lower CU traits. Using the NICHD index of parental sensitivity derived from parent-child observations at ages 24, 36 and 58 months, Wagner et al. (2015) found that less sensitive parenting predicted higher levels of CU traits in first grade controlling for earlier measures of CU behaviours.

The Pittsburgh Mother & Child Project (PMCP), a longitudinal study of 310 boys from low-income families (Shaw, Gilliom, Ingoldsby, & Nagin, 2003), explored harsh and positive parenting dimensions using observational methods at age 24 months (Waller et al., 2017). Harsh parenting was assessed during a clean-up procedure, and positive parenting was assessed during naturalistic observations in the home. CU traits were assessed as a 5-item factor generated as one of three previously validated externalising factors derived from the CBCL at 42 months (Willoughby et al., 2011). As one of the other CBCL factors assessed ODD behaviours, the study could examine specificity to CU behaviours. CU traits were assessed at age 42 months and 10 years. The distinctive paths from harsh and positive parenting to CU traits and ODD were examined using SEM. Positive but not harsh parenting predicted CU traits but not ODD, providing good evidence for a specific association between early positive parenting and CU traits in boys.

Findings from the large high-risk multi-ethnic study, the Early Steps Multisite trial of the Family Check-Up parenting intervention (659 children at ages 2 and 3) (Dishion et al., 2008), have however provided less consistent evidence. In the later of two publications on the role of parenting and CU traits from the study, Waller et al. (2012) simultaneously examined the contributions of observed and reported positive and harsh parenting on CU traits. Findings indicated that harsh parenting at age 3 years predicted increased CU traits at age 4 years, while positive parenting was associated with decreased levels. Later, Waller et al. (2014) examined longitudinal contributions of expressed parental warmth (Five-Minute Speech Sample - FMSS; Magaña et al., 1986) and observed parental warmth (Infant/Toddler Home Observation for Measurement of the Environment - IT-HOME; Bradley & Corwyn, 2002) on CU traits. Annual assessments were conducted in the families' households for 2.5 hours approximately, which included free play with mothers (4 minutes), a clean-up procedure (5 minutes), a delay of gratification task (5 minutes), and four teaching tasks (3 minutes each), as well as the administration of the questionnaires. Parental warmth was assessed using items such as "Parent's

voice conveys positive feelings towards child", and "Parent caresses or kisses child at least once during visit". CU traits were again assessed not from a purpose-designed measure of CU traits but using items from three measures: the ACRS, the CBCL and the ECBI. Specificity for CU traits was examined by controlling for concurrent CPs. Higher levels of both observed and expressed parental warmth at age 2 years predicted decreased 3 years CU traits. The study did not examine specificity of positive parenting for CU traits as negative parenting was not included.

Although the outcome was assessed during first grade at ages 6 and 7, the large prospective study of Mills-Koonce et al. (2016) is highly relevant. Maternal sensitivity and hostile intrusiveness were assessed several times using NICHD procedures and coding methods in 1230 children up to age 3 years, and each independently predicted CU traits. Sensitivity also predicted lower CPs, whereas the role of hostile-intrusiveness was not clearly observed. Unlike studies described earlier, CU traits were assessed using the ICU.

Although many of the hypotheses regarding parenting and CU traits focus on positive parenting, the case has been made that there may be parenting practices that increase as well as decrease risk for CU traits (Brown, Granero, & Ezpeleta, 2017). As this review shows, while there is substantial support for positive parenting as protective, the evidence is not consistent and some studies have also found a relationship between negative parenting and higher CU traits (Centifanti et al., 2016; Hawes et al, 2011; Mills-Koonce et al., 2016; Pardini et al., 2007; Waller et al., 2014).

Overall, results regarding negative parenting are consistent with the idea that it interferes with the internalisation of social norms and with the children's development of empathy and conscience (Kochanska, 1997). Moreover, regular exposure to punitive practices may negatively influence children's development of guilt and concern about other's emotions (Kochanska Gross, Lin, & Nichols, 2002) and may lead to the children's replication of aggressive and noncompliant

patterns (Burke, Pardini, & Loeber, 2008), increasing the risk for developing CU traits (Frick et al., 2003; Waller et al., 2016a).

In this Section, I outlined inconsistencies in the evidence regarding associations between parenting and CU traits. In this line, future studies must address three key elements: First, as most of the studies often involve children and adolescents, identifying whether these associations are also observed in preschool children has the potential to inform early treatment targets. Second, it is important to address specificity when predicting CU traits by controlling for CPs and vice versa, and when predicting CU traits or CPs from positive parenting by accounting for negative parenting and vice versa. Third, there is scarce literature regarding CU traits outside westernised countries, which highlights the need to examine whether the reported results are also applicable in a different cultural context. These limitations are addressed in the present PhD across four papers.

The next Section describes studies conducted with adoption and twin samples that have explored the role of parenting dimensions on CU traits accounting for genetic risk. These studies are relevant to underline the role of the environment, particularly parent and child interactions, even in the context of the genetic risk that has been identified for CU traits.

2.6.4. Studies of parenting and CU traits accounting for gene-environment correlations and examining modification of genetic effects by parenting

As outlined in the previous Sections (2.3 and 2.4), the role of biological and genetic factors, particularly in CU traits, is well recognised. Nevertheless, twin and adoption studies evidence that environmental factors such as parenting could modify the genetic influences on CU traits. In this regard, Henry and colleagues (2018) conducted a study with a sample of 662 dizygotic and monozygotic twin pairs from the Quebec Newborn Twin Study (Boivin et al., 2013). They studied whether genetic or environmental factors prompt stability or changes in CU traits and in which degree, timing and dynamics. Results indicated that the influence of genetic

factors for CU traits at ages 7, 9, 10, and 12 years was attenuated when accounting for parental warmth and rewarding parenting at age 63 months.

Similarly, Waller et al. (2018) explored the association between parental warmth and CU traits in a cross-sectional study conducted with 227 monozygotic twin pairs aged between 6 and 11 years old. Parental warmth was assessed using a parent-report scale and CU traits using the ICU. Aggression levels, for specificity in predictions on CU traits, as well as child gender and age and family income were included in SEM. Results indicated that lower levels of warm parenting specifically contributed to CU traits as such lower levels of CU traits were observed in the twin that received warmer parenting. Harsh parenting contributed to both CPs and CU traits. Likewise, the systematic review by Moore, Blair, Hettema and Roberson-Nay (2019), which included 24 studies of the genetic aetiology of CU traits, showed that positive reinforcement explicitly constitutes a practice that attenuates the genetic vulnerabilities for CU traits. By contrast, negative reinforcement was not associated with reduced CU traits in the reviewed studies.

Prospective research with adoption samples points out to similar conclusions. Waller and colleagues (2016b) conducted a study with a sample of 561 children and their adoptive and biological parents. The heritable risk to CU traits at 27 months -biological mother fearlessness- was diminished when adoptive parents presented increased levels of observed positive reinforcement during a tidy-up procedure, even after accounting for initial levels of CU traits and child's fearlessness. With the same sample, Hyde et al. (2016) found that adoptive mothers' positive reinforcement at age 18 months was a protective factor for CU traits at age 27 months, regardless of the identified biological risk from antisocial biological mothers.

Regarding negative parenting, a study of 9.462 children at ages 4, 7, 9 and 12 years from the Twins Early Development Study (Oliver & Plomin, 2007) examined genetic and environmental contributions to CU traits trajectories based on assessments of CU traits at each age, and CPs at ages 4 and 12 years. Negative parenting was identified using the Parent Feeling

Questionnaire at age 4 years. Four distinct CU traits trajectories groups were identified from early childhood to early adolescence (high, increasing, decreasing and low). Developmental trajectories were predominantly influenced by genetic and less influenced by environmental factors. However, gender differences in high stable groups were observed, with environmental factors -specifically negative parenting- predominant in girls, while genetic contributions were predominant in boys (Fontaine, Rijsdijk, McCroy, & Viding, 2010). In a subsequent study, Trentacosta et al. (2019) examined the associations between harsh parenting and CU behaviours in the same sample of children with their adoptive and biological parents. Parent-reported measures of harsh parenting at age 27 months and children's CU traits at age 54 months were used. Authors found reciprocal relationships between adoptive parents' harsh parenting and children CU traits and, in a second analysis accounting for biological parent fearlessness, they found an association between adoptive parent harsh parenting and child CU traits in the context of high biological parent fearlessness.

2.7. What is the nature of the association between CU traits and conduct problems?

Biological and neurocognitive mechanisms present in children with elevated CU traits are thought to increase the risk of aggressive behaviours (Blair et al., 2014). These may, for example, implicate failures to recognise and respond to other's signs of fear and sadness, perhaps related to the lack of eye contact during social interactions (Blair, Colledge, Murray, & Mitchell, 2001; Dadds, Jambrak, Pasalich, Hawes, & Brennan, 2011). It is hypothesised that this inadequate response leads to persistent aggressive behaviour because the normal inhibitory effect of other persons' distress when harming them is reduced or absent (Blair, 2003; Blair, 2013b).

However, studies of CU traits in general population samples using latent-profile analysis indicate that, in contrast to clinical samples where all the children have CPs, many children with elevated CU traits do not present aggressive or other problematic behaviours (Fanti, 2013; Rowe et al., 2010; Wall, Frick, Fanti, Kimonis, & Lordos, 2016). Limited evidence is available of the processes that lead some children with high CU traits to develop aggressive and antisocial behaviours, while others do not. One possibility is that the risk for aggression arises from the combination of unresponsiveness to others' distress seen in CU traits and a second source of vulnerability. Different sources of vulnerability are presented in preceding studies. Wright, Hill, Pickles and Sharp (2019) identified the moderating effect of low cortisol reactivity in the association between CU traits and aggression. Also, Waller et al. (2016b) found that biological mothers' fearlessness predicted increased CU traits in children with early low behavioural inhibition. Similarly, low mentalisation is identified as a source of vulnerability for CU traits. Taubner, White, Zimmerman, Fonagy and Nolte (2013) identified that deficits in mentalisation moderated the association between CU traits and aggressive behaviour in a sample of adolescents.

These direct tests of synergy conducted using moderator analyses, are consistent with findings from studies using latent-profile analysis in large samples. This analysis allows the identification of distinct groups regarding CU traits and CPs levels (high on both CU and CP,

High on CP and low in CU, and high on CU and low in CP) to identify the interrelation between CU traits and CPs. In a sample of children from ages 7 and 11 years, it was found that children with increased CU traits and low CPs presented decreased scores on impulsivity compared with children presenting both CU traits and CPs (Wall et al., 2016). Accordingly, a study including adolescents pointed out that the group with increased CPs and CU traits were at higher risk for future substance use and impulsivity, among other problems, compared to the group with low CPs and CU traits (Fanti, 2013).

A further possibility is that CU traits create vulnerability for CPs, specifically among children who are already aggressive. This vulnerability is created by the reduced response to, or concern for, the harm children with CU traits cause to others, which in turn decreases their likelihood of desisting their aggressive behaviour. In this line, we hypothesise that the association between CU traits and future aggression is significant and stronger in the presence of current aggression, compared to children without aggressive behaviours. This possibility received some support from a prospective study of a group of children recruited at ages 4-6 years, and another group at ages 7-9 years, which found a synergistic effect of baseline CU traits and CPs in boys in the younger group and in girls in the older group (Dadds et al., 2005). However, overall, there is limited evidence regarding this possibility and none from LMICs.

To provide evidence in this regard in a sample of young children form a LMIC setting, one of the aims of the present PhD project is to explore whether baseline levels of aggression have a main effect on later aggression after accounting for CU traits, or whether the synergistic effect of initial aggression and CU traits is the one contributing to increased future levels of aggression (Paper 2, Chapter 4). Next Section is an overview of previous research exploring the protective role of parenting on the proposed association between CU traits and CPs. These studies are the basis for Paper 3 (Chapter 5), which explores whether positive parenting has a modifying effect in this regard.

2.7.1. The role of parenting in modifying the effect of CU traits on conduct problems

Given the evidence for stronger environmental influences on CPs in general, it has been hypothesised that quality of parenting will influence CPs to a greater extent in the absence of CU traits. That is to say, negative parenting will predict higher levels of CP in the presence of low CU traits. However, given the evidence reviewed earlier for the role of positive parenting in lowering CU traits, might positive parenting be more influential in the presence of high CU traits. Findings from Pasalich and colleagues (2011) are consistent with this proposal. They examined the moderating role of CU traits on the association between observed coercive and warmth parenting and CPs in a sample of 95 clinic-referred boys (age 4-12 years). Coercive parenting was identified through parent-child family interactions, and warm parenting using the FMSS. Regression analysis revealed different associations between parenting dimensions and CPs in children with low CU traits compared to those with high CU traits. Associations between coercive parenting and CPs in children with decrease scores on CU traits were found, whereas parental warmth was strongly and negatively associated with CPs in boys with high levels of CU traits.

Falk and Lee (2012) hypothesised that negative parenting dimensions from the APQ and CU traits using the APSD would be associated with disruptive behaviour, while APQ positive parenting scales would be negatively associated with CPs. This study of 208 children aged 6-9 years with ADHD, showed that, in contrast to Pasalich et al. (2011), positive dimensions of parenting were negatively linked to conduct disorders in children with low/moderate CU traits, whereas this association was not found in children with high CU traits.

Evidence from prospective studies is somewhat inconsistent. A study with 1.233 girls at age 7-8 years, examined the association between contextual risk factors and future CPs in girls with low and high levels of CU traits. Maternal warmth predicted decreased levels of CPs among girls with high CU behaviour, but this interaction was no longer significant when girls were 12-13 years old (Kroneman et al., 2011). In a study of 120 aggressive children at age 9-12 years and

followed one year later, it was studied whether parenting negative and positive dimensions modified the association between children CU traits and aggression. No evidence of modification by physical punishment nor parental warmth or involvement was found in this study (Pardini et al., 2007).

Similarly, Waller et al. (2015a) explored whether CU behaviour in young children aged 2 to 4 years (N= 364) modified the relationship between observed harsh and warmth parenting and CPs. Overall results demonstrated that, prospectively, parenting dimensions in young children directly predicted CPs despite children's CU traits levels. Previous research with the same sample (Hyde et al., 2013) showed comparable results. No moderation effect of CU behaviour at age 3 years in the association between observed positive parenting and externalising behaviours was identified. Conversely, Kochanska, Kim, Boldt and Yoon (2013) prospective study with a sample of 102 children, found evidence of the moderating role of CU traits. This study showed that children CU traits at age 67 months modified the relationship between parent-child interactions based in mutually responsive orientation (age 38 and 52 months) and children's externalising behaviour at ages 67, 80 and 100 months.

Thus, the proposal that positive parenting may protect children from the effect of CU traits on CPs is plausible, the evidence is so far mixed. For this PhD study, building on the findings of Paper 2 where it was found that CU traits only predicted future aggression in children who were already aggressive, we tested whether the moderating role of positive parenting was further moderated by concurrent aggression. Although the evidence does not provide clear indications of which aspects of positive parenting might be relevant, theoretical accounts propose a role for positive reinforcement in reducing antisocial behaviour in individuals with CU traits as it capitalises on their reward dominant response style (Reidy et al., 2017) and work on the development of conscience suggests that warm mutually responsive parenting promotes the internalisation of social norms in children who are at risk for aggression (Kochanska, 1997). We therefore hypothesised that both positive reinforcement of prosocial behaviours and maternal

positivity would moderate the association between CU traits and later aggression, and that this would be stronger in children who were already aggressive (See Chapter 6).

2.8. Evidence from Latin America on conduct problems and parenting

So far, most evidence regarding the associations between CU traits and CPs and parenting dimensions has been mostly confined to HICs. In this Section, I present an overview on the available evidence exploring this association in America Latina, where most countries are classified as LMIC. First, information of the prevalence of CPs in some Latin American countries is presented to provide a context of this phenomenon in children and adolescents. Second, studies describing the association between CPs and positive and negative parenting dimensions is provided. Third, evidence from Colombia, particularly focused on the parental practices across Colombian regions, is described, where corporal punishment appears as one of the most used practices.

Vicente et al. (2012) report the prevalence of CPs in Latin American children. In Brazil, 7% of children aged between 7 and 17 years met the criteria for CPs. By contrast, the reported prevalence in Santiago de Chile in children between 4 and 11 years old was 15.6%. In the case of Colombia, the last national mental health survey reported rates of CPs of 8% in children from 7 to 11 years and reported that 10 to 15% of the adolescents presented problematic behaviours such as substance use, criminal behaviours, and scholar dropout (Encuesta Nacional de Salud Mental, 2015). Poverty, violence exposure, post-traumatic war-related experiences, low parental educational level and region of residence were associated with emotional and behavioural problems among Colombian children and adolescents (Gómez-Restrepo et al., 2016).

Regarding parent-child interactions, research has also explored whether they pose a risk or a protective factor for CPs. In Mexico, a study with 300 parents and their children between ages 2 and 12 years included self-reported and observed measures to identify the correlation between parenting styles and ODD and aggressive behaviours. A significant correlation between the use of punishment and ODD was found, while the use of positive reinforcement and parental involvement was negatively related to aggressive and ODD behaviours (Morales, Félix, Rosas, López, & Nieto, 2015).

In a Chilean study of 429 children between 2 and 5 years old (46% girls), the APQ and the CBCL teacher and parent reports (α= .95) were used to assess parenting practices and children's internalising and externalising behaviours. Authors found associations between low socioeconomic status (SES) and both externalising and internalising behaviours. Correspondingly, SES was related to the type of parenting practices, in which middle-high income families reported adaptative and involved parenting strategies, while low-income families indicated high levels of conflicts and punitive practices (Peris, Maganto, & Garaigordobil, 2018).

Evidence regarding the association between social information processing in parents and harsh parenting is presented in the study by Lansford and colleagues (2014). This prospective study involved 1.297 participants from nine countries, including 108 families from Colombia (other countries were China, Italy, Jordan, Kenya, the Philippines, Sweden, Thailand and the USA). Social information processing was assessed when children were 8 years old using the Extended Concerns and Constrains Questionnaire (Deater-Deckard, Dodge, Bates, & Pettit, 1996). Harsh discipline was assessed at age 9 years using items from the Multiple Indicator Cluster Survey from UNICEF (2006). SEM analysis showed that, across the nine countries, positive evaluation of aggressive parenting predicted the use of harsh discipline to control children's negative behaviour.

With the same sample, Lansford and colleagues (2018) conducted assessments to explore bidirectional associations between warmth and parental control and children internalised and externalised behaviours across the nine countries. Children were systematically assessed during six years since age 8 years by gathering information from both parents and their children. Again, the Colombian sample included 108 families (56% girls). Parenting dimensions were assessed using the Parental Acceptance-Rejection/Control Questionnaire (Rohner, 2005), and the CBCL was used to assess children's behaviour. Gender and parental educational level were introduced in SEM analyses as covariates. Overall results indicated that externalising behaviours predicted

less parental warmth from age 8 to 13 years, while predictions about the contribution of warmth on externalising behaviours were found only from age 9 years to age 10 years. Negative associations were found between parental warmth at ages 8 and 9 years and internalising behaviours at ages 9 and 10 years, respectively. Contributions of internalising behaviours on parental warmth were observed at ages 8 and 10 years in ages 9 and 12 years, respectively. No associations were found between parental control and externalising behaviours. However, externalising behaviours predicted parental control from ages 8 to 12 years. Parental control at age 9 years was only moderately associated with internalising behaviours at age 10 years, and internalising behaviours at ages 8, 9 and 10 years predicted parental control at ages 9, 10 and 12 years, respectively. Similar findings were observed across the different countries.

Focusing on Colombia, the setting for this PhD project, evidence about the association between positive parenting and CPs is limited. For instance, Lila, García and Gracia (2007) found that positive interactions between parents and children had positive effects on children's well-being. Children from 7 to 13 years old who perceived parental acceptance due to physical and verbal expressions of love and warmth, reported higher scores of social and psychological adjustments. Regarding parental warmth, Lansford et al. (2010) cross-cultural research found that Colombian parents were amongst the countries showing the highest levels of warmth and there were no significant differences across countries in the association between child reported parental warmth and child aggression.

A systematic review explored extant literature regarding rearing practices in Colombia (Tilano, Londoño, & Tobón, 2018) in which 43 studies between years 2004 and 2014 were included. Search terms included rearing practices, family interactions, parenting and parenting styles. Most of the identified studies were conducted in the Central region (82%) and only a few in the Caribbean (11%) and Pacific (7%) regions. Limitations of the reviewed studies included: 1) lack of consensus on a clear-cut approach to understanding rearing practices, as there are multiple approaches emerging to explain the same phenomenon; 2) most of the studies involved

solely descriptive or correlational analyses with cross-sectional data; 3) studies were concentrated in one region, which disregards the multicultural nature of the country; 4) samples were not representative of the country's features in terms of gender, SES, educational level, among other sociodemographic variables; and 5) most of the measures used to capture parenting were not previously validated for the Colombian population.

Regarding Colombian multicultural characteristics, Puyana and Mosquera (2003) described cultural differences in parenting practices across principal cities (Bogotá, Medellin, Boyacá, Cartagena and Cali). Parenting behaviours have changed in the past decades: parents used to be more distant with their children, less involved in their daily life activities, promoted hierarchical based relationships, and frequently used corporal punishment. Parent-child interactions have become closer, with recurrent affective expressions, equitable relationships, and improved communication skills, primarily prompted by mothers.

Parents from the Central region often use affective expressions with their children without gender differences. By contrast, parents from the Caribbean region use different practices: fathers are inclined to use punishment to ensure appropriate behaviours and are less involved in playful activities with their children, while mothers are more affective and protective. Parents from the Central and Pacific regions shared similarities such as close and affective interactions and reduced rates of physical punishment (Puyana & Mosquera, 2003).

However, studies show that corporal punishment is still a persistent phenomenon among Colombian parents. González, Trujillo and Pereda (2014) found that physical punishment remains a recurrent practice in Bogota rural areas, where 41% of the sample (N= 620 parents) reported its frequent use in children from 5 to 8 years old. Authors reported that these results are related to the Colombian culture, where fathers tend to use physical punishment to produce children behavioural changes as a form of "*machismo*". A recent study in four Colombian cities found that 77% of the parents (N= 853) reported the use of punitive practices with their children during the last year. This prevalence is higher compared to HICs studies and may be associated

with a violent culture in the country, which can promote, for instance, the normalisation of violence in daily interactions (Trujillo, González, Fonseca, & Segura, 2020).

While associations between parenting and CU traits and CPs have not been examined outside of HIC settings, some studies do indicate cross-cultural differences in parenting practices that may be relevant. The evidence suggests that Colombian parents are prone to authoritarian parenting attitudes (strictness, respect for authority, and obedience) and to use physical punishment (Bornstein, Hahn, & Haynes, 2011; Lansford et al., 2010) compared to HICs and other LMICs (China, Colombia, Italy, Jordan, Kenya, the Philippines, Sweden, Thailand, or the United States). However, cross-cultural studies by Lansford and colleagues, which included Colombian participants, did not find evidence for significant difference across countries in the association between physical punishment and child aggression.

These findings underline the need of further evidence regarding the association between parenting practices and later children's outcomes in LMIC settings (Paper 2, Chapter 4). Furthermore, it is relevant to identify whether particular social factors frequently observed in LMIC settings, such as community violence, give raise to increased negative outcomes in children who are exposed, and whether positive parenting constitute a protective role (Paper 4, Chapter 6) as found in previous studies from HICs.

2.9. Exposure to community violence and problematic and antisocial behaviours in children

The Office on Drug and Crime (UNODC; United Nations) reports that criminal and violent acts remain a socio-economic phenomenon worldwide, being countries from America Latina some of the most affected (Cruz, 2016). Community violence is characterised by political violence, organised crime, and drug trafficking. This form of violence leads to increased economic costs for the society, which in turn restricts countries' development, and promotes the inter-generational permanency of violent acts. Moreover, the UNODC reports associated social risk factors for community violence, involving families' income inequalities, media violence, accessibility to weapons, as well as limited legal policies to counteract criminality.

Particularly in Colombia, around nine million of its population -more than 17% of the Colombian population- has been victim of the armed groups, societal problems as land distribution and drug trafficking during the past three decades (Unidad para las Víctimas, 2018). It is worth noting that forced displacement is the main cause of victimization in the country, accounting for more than eight million victims (Centro Nacional de Memoria Histórica, 2018). This phenomenon leads to profound changes in families' structures, roles and interactions, as well as in the quality of life of its members (Burgess & Fonseca, 2019) and has negatively affected the population regardless of age as such early childhood victimisation has been reported in 321.558 children (Unidad para las Víctimas, 2018).

Colombia signed a peace agreement in 2016 with one of the oldest guerrillas in the country (FARC-EP). Despite the positive social impact of the peace process and the implementation of the agreement, criminal bands, illegal armed groups who have not yet demobilised, and common delinquency remain a significant problem in both rural and urban areas in the country (Ortega-Guerrero, 2018). Data suggests that Colombia has an increased risk for community violence among rural and poor areas, as well as marginalised urban neighbourhoods. As proposed by Westbrook and Harden (2010), low-income areas are at higher risk to be affected by violent actions compared to those living in middle or high-income settings,

which in Colombia corresponds to 45% of the country's population. These are families living in poverty with restricted access to primary resources (Fernandez, Ibáñez, & Peña, 2014), increasing the risk for community violence exposure.

Being exposed to community violence involves one of two scenarios: to observe and be immersed in violent situations or to be a direct victim of violent acts within a community (Schwab-Stone et al., 1995). Diverse forms of violent behaviours in the community are described in preceding literature, including criminality, delinquency, substance abuse and interpersonal aggression. Associations between exposure to community violence and adverse child emotional, social, academic, behavioural, and cognitive outcomes are well established (Linares et al., 2001; Sharkey, Schwartz, Ellen, & Lacoe, 2014). Moreover, violence exposure increases the risk for affective disorders and CPs in children that are exposed to, compared to those who are not (Lambert, Tache, Liu, Nylund-Gibson, & Ialongo, 2019). In the case of conflict-affected settings, children's negative outcomes associated to the exposure to violence include post-traumatic stress, affective symptoms, and aggressive behaviours (Foster & Brooks-Gunn, 2015). Furthermore, it is thought that violent contexts may lead to future antisocial behaviours in children and adolescents (Mrug & Windle, 2009) even after accounting for initial levels of aggressive behaviour (Weaver, Borkowski, & Whitman, 2008). Thus, violence in the community context may serve as an exacerbating factor for children already presenting CPs or antisocial behaviours.

Evidence regarding the association between high-risk neighbourhood environments and CPs in children and adolescents is also widely reported (Busby, Lambert, & Ialongo, 2013; Cooley-Strickland, Griffin, Darney, Otte, & Ko, 2011; Fleckman, Drury, Taylor, & Theall, 2016; Kersten et al., 2017; Mohammad, Shapiro, Wainwright, & Carter, 2015). In a study of 88 children from the USA at ages 3, 10, and 14 years, exposure to community violence during childhood was associated with antisocial outcomes in adolescence after accounting for children's baseline externalising problems (Weaver et al., 2008). Linares and collaborators (2001), carried

out a study of the influence of community violence exposure on young children's mental health. In a sample of 160 children from the USA aged between 3 and 5 years, families residing in a low-income and high-crime contexts had elevated behavioural problems.

Particularly in Colombia, a study conducted with 1.235 children and adolescents from Bogotá, found that community violence was linked to both reactive and proactive forms of aggression (Chaux, Arboleda, & Rincón, 2012). Cuartas and Leventhal (2020) examined whether violence proximity was associated with children's adverse outcomes in a sample of 404 children between 7 and 11 years old. Results indicated that violent contexts prompt children's problematic behaviours, particularly in those children whose parents present poorer mental health. This study was distinctive for using police records to identify exposed and unexposed children in the same areas of a city, as a way of dealing with confounding by family socioeconomic factors. Molano, Harker and Cristancho (2018) analysed data from 5.801 Colombian children with an average age of 11.01 (SD= .75). Authors found that indirect exposure to violent crimes, such as homicides, is associated with children's empathy and self-regulation development but not with aggressive behaviours.

Few studies have examined the association between community violence and CPs in preschool children from LMICs but all outside Latin America. Cross-sectionally, Shahinfar, Fox and Leavitt (2000) showed that exposure to community violence predicted higher parental reports of aggression in a sample of 155 pre-schoolers aged 3.5 and 4.5 years. Similarly, Linares et al. (2001) found an association between exposure to violent settings and externalising behaviours in 160 children at age 3-6 years. However, this association was markedly reduced and became non-significant after controlling for maternal depressive symptoms. Prospectively, in a study of 625 South African children, exposure to community violence at age 5 years was associated with parent-reported aggression one year later (Barbarin, Richter, & DeWet, 2001). However, analysis in this study did not control for child aggression at age 5 years, so the incremental effect of community violence could not be identified.

Most studies exploring exposure to community violence have been of children and adolescents who are able to complete self-report measures such as the Survey of Exposure to Community Violence from Richters and Saltzman (1990). Studies of preschool children have used a wide variety of methods, including a Q-sort procedure (Barbarin et al., 2001) to categorize levels of violence exposure in the communities, and a latent variable derived from several indices of local crime, social disorder and witnessed violence (Linares et al., 2001). As reported in Paper 4 (Chapter 6) in the light of this variability we devised a 4-item measure designed to reflect experiencing major violence or disruption to include exposures likely to reflect conditions in Colombia.

Evidence on whether the association between the exposure to community violence and CPs may be mediated via CU traits is also limited. Psychological and biological mechanisms that might link community violence to CU traits have been proposed. For instance, exposure to violent settings may lead to desensitization to the effects of violence on victims (Davis, Ammons, Dahl, & Kliewer, 2015). Also, it has been suggested that violence exposure fosters coping strategies involving a reduction in processing of others' social and emotional cues (Hill, Murray, Leidecker, & Sharp, 2008) or negatively impacts physiological and neurobiological responsivity (Hill & Maughan, 2015; Saxbe et al., 2018).

Very little is known about exposure to community violence and CU traits. In a sample of 236 adolescents from low-income families with an average age of 13 years, community violence exposure was associated with increased CU traits (Davis et al., 2015). Kimonis, Frick, Munoz and Aucoin (2008), in a study of 88 male adolescents with an average age of 16 years, found an association between emotional processing and CU traits among aggressive adolescents who were exposed to community violence.

In addition to the previously described main effects of positive parenting on CU traits, dimensions of positive parenting may constitute a modifier in the association of environmental risks, particularly the exposure to community violence, and CU traits. Several studies of the

association between exposure to violence and child aggression have reported moderation by positive parenting, possibly indicative of a protective effect. These include studies of resilience to exposure to military violence in Palestine (Punamäki, Qouta, Miller, & El-Sarraj, 2011) and Israel (Slone & Shoshani, 2017), and community violence in South Africa (Barbarin et al., 2001). However, only the prospective study of adolescents by Davis et al. (2015) examined the role of positive parenting in relation to exposure to community violence and CU traits. They found that witnessing and hearing about community violence were associated with elevated CU traits and that supportive relationships with caregivers were associated with lower CU traits. However, they did not find moderation by quality of caregiver relationships of the link between community violence and CU traits. In this study, as in the others of possible protective effects of positive parenting in the exposure to community violence, parent-child interactions were assessed using self-report perceived support.

In Paper 4 of the present thesis, we examine the association between the exposure to community violence and CU traits and explore whether observed maternal praise and positivity constitute protective factors by modifying the expected association. This study is the first to address these questions in a sample of young children from a LMIC in America Latina, who are at higher risk for community violence exposure (Chapter 6).

2.10. Thesis objectives and hypotheses

This PhD study has two general objectives: first, to explore the relevance of CU traits to understand CPs, particularly aggression, and second, to identify the role of positive parenting in both CU traits and CPs in children at age 3.5 years and followed-up at age 5 years from a historically conflict-affected LMIC. Specifically, in four papers it was examined: 1. The factor structure of the Inventory of CU traits (ICU) and the Alabama Parenting Questionnaire previously found in HICs. It is hypothesised that both questionnaires present similar psychometric properties as those identified in later research. 2. The incremental validity of the ICU as a novel question about the role of CU traits in the origins of aggression. The hypothesis is that CU traits from the ICU predict future aggression. 3. Specificity of the contribution of positive parenting dimensions on CU traits in cross-sectional analysis. The hypothesis is that negative parenting will be associated with CPs in general, while positive parenting will be specifically associated with CU traits after accounting for CPs and negative parenting. 4. The interplay between CU traits and early aggression and later aggression. It is hypothesised that CU traits predict later aggressive behaviours in children with initial levels of aggression in two different culturally settings: Colombia and the UK. 5. The prospective role of maternal positivity and praise on the association between CU traits and aggression in high aggressive children. It is hypothesised that positive parenting dimensions may constitute a restraint on aggressive behaviours in those children with increased CU traits. 6. The protective role of positive parenting in the association between exposure to community violence and later CU traits. It is hypothesised that positive parenting will be associated with lower CU traits and that positive parenting has a protective effect in the link between community violence and CU traits.

2.11. La Sabana Parent-Child Study general method

2.11.1. Participants

Colombian families from *La Sabana Parent-Child Study* were invited to participate through social networks, principally Facebook groups, that involve mothers as main participants (e.g., “Enterprising women Colombia”, “More moms Colombia”). We use Facebook to recruit participants, as it is estimated that 91% of the Colombian population between ages 14 and 65 years uses this social network (Ministerio de Tecnologías de la Información y las Comunicaciones, 2018). A description of the study objectives, study procedure, voluntary participation, and incentives for children (e.g., toys, books, and didactic material) was provided to the mothers that replied to the invitation. Parents who responded to the Facebook invitation (N= 344) were contacted to discuss participation. Of these, 40 were excluded as their children did not meet the age range inclusion criteria (between 3 to 4 years to establish a sample of children with mean age 3 years 6 months). Of the remaining 304, 235 (77.3%) agreed to take part in the study and provided full data. Participants were informed about parent-child play and tidy-up procedures, length of the home visit (approximately 2.5 hours) and the nature of the information gathered using questionnaires.

The baseline sample (N= 235) consisted of children aged from 2.10 to 4.2 years old (M= 3.3, SD= .47), 51% males (n= 129) and 49% females (n= 115). For the follow-up assessment, 220 children from the baseline sample participated (93.5%). To achieve this retention rate different strategies were implemented, including incentives such as toys and didactic material for the children and money for mothers in each assessment, sending personalised messages on children’s birthday and holidays, updating contact information between assessments, and sending overall information regarding the study results in each assessment using booklets and videos. Participants reported that these strategies were positively valued by them and increased their commitment with the study. Children aged between 4.10 to 5.8 years old (M= 4.9, SD= .42), 51% males. Mother’s age ranged between 17 to 54 years old (M= 30.04, SD= 6.29) and

fathers age was between 19 and 63 years old (M= 33.13, SD= 7.57). Participants were from three Colombian regions (Pacific= 69, Central= 96, and Caribbean= 70), each region representing different cultural, sociodemographic, and economic features of the country: Pacific and Caribbean regions are characterized by high levels of poverty and large numbers of Afro-Colombian and Indigenous inhabitants, whereas the Central region has the lowest levels of poverty in the country, and it is predominantly *mestizo* (mix of European and Indigenous) (Ministerio de Ambiente y Desarrollo Sostenible, 2013). Almost half of the participants were classified as low-income families (45%) and 15% lived in rural areas.

Predominantly, mothers were the main informers during the baseline and follow-up assessments (93.6% and 96% correspondingly), while few fathers (4.6% and 2.3% correspondingly) and grandmothers (1.7% in both assessments) participated as the primary informers. Overall, most families (77%) were two-parent, 42% were extended families, and 44.7% had more than one child. Regarding parents' educational level and occupation, 50% of mothers and 48% of fathers had education beyond high school, and 47% of the mothers were employees, 12.4% were students, 17.5% independents, 5.6% unemployed, and 10.3 % in charge of housekeeping, while 65% of the fathers were employees, 4.6% students, 25% independents, 2.5% unemployed and 1.5% were in charge of housekeeping. Participant's ethnicity indicated that 38% participants identified themselves as *mestizo*, 9% Afro-Colombian, 5% Indigenous, 13% from 'other' ethnic groups, and 35% did not identify themselves as belonging to a specific ethnic group.

2.11.2. Measures

In this subsection, I make a broader description of the measures that were used in this thesis across the different studies, as they are described briefly on each paper. First, items regarding the sample's sociodemographic characteristics and exposure to community violence are described. Second, I describe measures of child behaviours. Third, I describe parent reported

and observed measures of parenting dimensions along with the systems used to rate parent-child interaction procedures, and finally, I report variables that were included as confounders.

Sociodemographic Questionnaire. Colombian participants completed an adaptation of the questionnaire used in the *Wirral Child Health and Development Study* (WCHADS; Bedford et al., 2015; Wright et al., 2018) to make cultural comparisons when relevant. Sociodemographic information included child and parents age, child gender (0= female, 1= male), household income classified into six categories based on the Colombian government system (Departamento Administrativo Nacional de Estadística - DANE, 2011), where categories 1 and 2 receive government subsidies representing low-income families (1) and categories 3 to 6 represent middle/high-income families (0), rural or urban households, parents' employment, and parents' educational level (0= no education beyond school, 1= education beyond school), family structure and ethnicity. From these variables, child gender, parent's educational level, household income, and region were included in the analyses as covariates.

Exposure to violent and adverse contexts. Review of the literature on the assessment of community violence revealed that there were established measures for older children based on their self-report (Richters & Saltzman, 1990). However, there have been very few studies involving younger children and measurement has been very variable, and there are no established measures. For example, studies have used indices of local crime (Barbarin et al., 2001; Linares et al., 2001), which would not have been feasible in this study. I therefore devised a measure drawing on national reports about the most recurrent violent and war-related actions against the Colombian population during the last years: almost 9 million victims during the last 10 years, where 89% were victims of forced displacement, 12% victims of homicide, and 5% victims of threatens (Unidad para las Víctimas, 2018). Four questions were included at age 5 years assessment to identify participants' levels of exposure to these adverse circumstances over the previous 18 months. A general statement was used to introduce the questions "During the last two years, in my neighbourhood... street fights have occurred; murders, kidnappings or forced

disappearances have occurred". Participants' rating options for these questions were "No (0)", "Yes, some cases (1)" or "Yes, several cases (2)". A question related to experiences with illegal armed groups asked, "During the last two years, have activities from the guerrilla of criminal bands affected you or your family?". Rating options were: "They have not affected us (0)", "They have affected us in a certain way (1)" or "We have been direct victims (2)". Regarding forced displacement, the question was "Have you or your family been victims of forced displacement (being forced to leave their households due to war-related circumstances)? Answer options for this question were: "We have not been victims (0)", "Yes, in some way (1)", "Definitively, we have been victims (2)".

Child behaviour measures

Inventory of Callous-Unemotional traits (ICU; Frick, 2004). The parent self-reported version of the ICU was used to measure the occurrence and intensity of children's CU traits. The inventory has 24 items scored on a 4-point scale (0= not at all true, 1= somewhat true, 2= very true, and 3= definitely true). Twelve positively worded items from the inventory (1, 3, 5, 8, 13, 14, 15, 16, 17, 19, 23, and 24) were reversed to calculate the overall score. Three components are captured by the ICU: callousness, uncaring and unemotional dimensions. The ICU has been extensively used in previous research, including studies with young children, with good reliability of the total scale (α= .83, Bedford et al., 2017; α= .84, Clark & Frick, 2016; α= .71, Wagner et al., 2015; α= .84, Waller et al., 2018). For this thesis, the ICU Spanish version was used, showing good internal consistency for this sample (age 3.5 α= .81, age 5 α= .85). Paper 1 (Chapter 3) presents results of the factor analysis of the ICU for the present sample, where the 12-item scale showed good fit for this data. In Papers 2 and 3 (Chapters 4 and 5) CU traits were included in the analyses as a predictor, while for Paper 4 it was included as an outcome (Chapter 6). Based on the results from paper 1, data analyses for papers 2, 3 and 4 were conducted using the 24-item version of the ICU as recommended by Ray and Frick (2018), and analyses with the

12-item version were included in the appendix of each chapter as it was the version that betted fitted this sample.

Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2001). The Spanish version of the CBCL for children aged between 1.5 to 5 years was used to identify children's CPs, specifically Oppositional Defiant Disorder (ODD) and aggressive behaviours. The questionnaire has 99 items that provide information about seven internalised and externalised problems: emotional reactivity, anxiety/depression, somatic complaints, withdrawal, attentional deficits, ODD behaviour, aggressive behaviour, and sleep-related problems. The CBCL 1.5/5 was completed by one parent, mainly the mothers, who were asked to rate the current and past six months child behaviour using a 3-point rating scale (0= not true, 1= somewhat true or sometimes true, 3= very true or often true). The CBCL was used in a preceding study with a sample of 904 Colombian children between ages 8 and 12 years (M= 9.81, SD= 1.25) with good internal consistency for the aggression scale (α= .86) and acceptable for ODD symptoms (α= .69) (Hewitt, Vila, & Juárez, 2016). For the present study, the aggressive behaviour scale composed by 19 items (8, 15, 16, 18, 20, 27, 29, 35, 40, 42, 44, 53, 58, 66, 69, 81, 85, 88 and 96) obtained good internal consistency at ages 3.5 years (α= .86) and at age 5 years (α= .88); the ODD behaviour scale composed by 6 items (15, 20, 44, 81, 85 and 88), got appropriate internal consistency at ages 3.5 years (α= .75) and 5 years (α= .80). ODD behaviours at age 3.5 years were included for specificity in predictions on CU traits in Paper 1 (Chapter 3) and aggressive behaviour at age 5 years was included as an outcome in Papers 2 and 3 (Chapters 4 and 5).

Parent-reported measure

Alabama Parenting Questionnaire (APQ, Frick, 1991). This is a self-report measure that comprises 42 questions to assess central aspects of parenting practices. *Parental involvement* comprises 9 items (1, 4, 6, 8, 9, 12, 15, 17 and 19; e.g. "You help your child with his/her homework"), *positive reinforcement* 6 items (2, 5, 11, 13, 14 and 20; e.g. "You praise your child if he/she behaves well"), *inconsistent discipline* 6 items (3, 7, 10, 16, 18 and 21; e.g. "You

threaten to punish your child and then do not actually punish him/her"), *punitive practices* 4 items (22, 23, 24 and 25; e.g. "You hit your child with a belt, switch, or other object when he/she has done something wrong"), *parental monitoring* with 6 items and *other discipline practices* with 7 items. Each question is answered in a 5-point rating scale (1= never, 2= almost never, 3= sometimes, 4= often, 5= always). The APQ-PR (Clerkin, Halperin, Marks, & Policaro, 2007) is a short version of the APQ devised for pre-schoolers, which includes 32 items from the original version, excluding items from the parental monitoring scale as they are not relevant for young children (e.g., "Your child goes out without a set time to be home" and "Your child is out after dark without an adult with him/her").

The Spanish version of the APQ (De la Osa, Granero, Penelo, Domènech, & Ezpeleta, 2014, Appendix 2A) was used during the baseline and the follow-up assessments, including only items from the APQ-PR. This Spanish version was previously validated with 2.283 young children from Spain (mean age= 2.97, SD= 0.16) with acceptable to appropriated internal reliability for the three scales (positive parenting α= .86; inconsistent discipline α= .70; punitive practices α= .54). For the present study, parental involvement obtained reliability coefficient of .73 at age 3.5 years and .69 at age 5 years, positive reinforcement .61 and .62 respectively, parental inconsistency .60 and .71 respectively and of .46 for punitive practices at both ages -probably because of the small number of items on the scale-. The factor structure of the APQ was explored in this sample in Paper 1 (Chapter 3) were positive reinforcement and parental involvement scales were compressed in 1 factor termed "positive parenting". Also, in this paper, positive parenting was included in the analyses for specificity on predictions on CU traits.

Parent-child interaction

Different studies examined parent-child interactions to identify its relationship with the presence of children's CPs and CU traits. Literature in this regard usually reports the use of observational methods to assess the quality of the relationships and parental responses to the child's behaviour during play and tidy-up procedures. Observational methods aim to evoke

behaviours that are representative of those generally presented in daily life interactions in a more "natural" context as home. This method is highly valid and useful for the identification of mechanisms that contributes to children's social interactions (Aspland & Gardner, 2003).

The *Qualitative Scales of the Observational Ratings of Mother–Child Interaction* (Child Agency code from NICHD Early Child Care Research Network, 1999) is a standardized play procedure used to capture parental behaviours, as well as parent-child interactions during baseline assessment. Three bags, labelled with numbers 1, 2 and 3, containing toys and didactic material are presented to the parent to be explored with the child. Parents were asked to explore the bags beginning with bag number 1. Bag 1 contained a pencil case with washable markers and pencils, stencils and a block of white paper, bag 2 had children costumes (fairy skirt with wand and crown, soldier helmet, a superhero shirt, chef attire and a princess costume) and a cash register with plastic food and money, and bag 3 contained building blocks. After 15 minutes of play, the parent was asked to encourage the child to tidy-up the material in each bag. The instruction given to parents to begin the interaction was: *"I would like you to play with your child with these 3 bags of toys. Please start with bag number 1 and move to bag number 2 and bag number 3 when it feels right to do so. After 15 minutes, I will say 'Tidy-up time', and I would like you to encourage your child to help you tidy the toys away"*. Play and tidy-up procedures were video recorded for later analyses using the DPCIS and PARCHISY coding systems, which are describe below. Transcripts of the 235 videos were completed for coding procedures.

Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, Nelson, Duke, & Boggs, 2004). The DPICS is an observational measure of parent-child interactions, which provides information of parent direct positive comments regarding child's behaviours or attributes termed *labelled praise*, and more global and unspecific positive comments termed *unlabelled praise*. This system was used to identify maternal praise during the tidy-up procedure. A Colombian professional in psychology was trained by an expert from the UK using a set of 30

videos already coded, in which high agreement between scores was achieved with all Interclass Correlation Coefficients were >= .78. The trained professional coded the parent-child interactions videos using the transcripts by giving a mark each time the parent praised the child behaviour. An overall score was obtained for labelled and unlabelled praise scales by the sum of the marks. Unlabelled praise was used in 4 or more situations by 14% of the parents, 38% used praise between 1 and 3 situations, and 48% did not use praise during the tidy-up. Since no situations of labelled prise during the tidy-up were observed in the present sample, unlabelled praise was included in Papers 4 and 5 to identify its moderating role in the association between CU traits and aggression (Chapter 5) and in the association between exposure to community violence and CU traits (Chapter 6).

Parent-Child Interaction System (PARCHISY; Deater-Deckard, 2000). The PARSHISY allows the identification of positive and negative behaviours during parent-child interactions. This system was implemented to code the NICHD interaction by identifying parental codes (parental behaviours) and dyadic codes (parent-child interactions). Parental codes included 5 scales: 1) *positive affect*, which denotes the use of positive emotions as smiling and laughing, and parental warmth; 2) *negative affect* reflecting emotions of sarcasm, anger, harsh voice, and hostility; 3) *positive content* that refers to praise, explanations and open-ended questions; 4) *negative content* that indicates the use negative physical contact and criticism; and 5) *responsiveness* to the child questions, comments or behaviours. Dyadic codes included 3 scales: 1) *reciprocity*, involving shared positive affect, eye contact and turn-taking interaction; 2) *conflict*, characterised by disagreements, negative affect and tussling over a toy; and 3) *cooperation* that entails working together and engaging in the play.

Using the interaction transcripts and a coding sheet that included descriptions and examples on each scale (Appendix 2B), two trained observers coded each behaviour's frequency using a 7-point scale (1= non shown to 7= constantly shown). Play and tidy-up procedures were coded separately: play was coded in periods of 30 seconds until completing the 15 minutes,

whilst the tidy-up was coded in periods of 20 seconds until completing 5 minutes. A mark was given when a target behaviour was observed in each sequence. Marks on each behaviour were summed to obtain a total score in a range of 1 to 7 points according to the PARCHISY manual. For the present study, *positive affect* and *reciprocity* scales (r= 56, p< .001; a= .72) were comprised to identify parental positivity (Deater-Deckard, Li, & Bell, 2016), and *negative affect* and *conflict* scales for parental negativity. We explored the moderating role of maternal positivity in the association between CU traits and aggression in Paper 3 (Chapter 5), and between exposure to community violence and CU traits in Paper 4 (Chapters 6).

Confounders

Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsy, 1987). The EPDS is a self-report 10-item scale that assesses postnatal depression considering the known symptomatology but removing somatic dimensions usually present in postnatal periods (variations in appetite and fatigue). Although this scale was designed to identify depressive symptoms during mothers' postnatal period, it has been implemented with general population of females (Matijasevich et al., 2014) and males (Anding, Röhrle, Grieshop, Schücking, & Christiansen, 2016) showing appropriate internal consistency. Items are answered in a 4-point scale (0 to 3) to rate symptoms frequency, each item with different answer options (e.g., "I have felt sad or miserable" 1= Yes, most of the time; 2= Yes, quite often; 3= Not very often; 4= No, not at all). The total score is calculated by the sum of the items responses after reversed seven items following authors instructions (3, 5, 6, 7, 8, 9 and 10). The EPDS was previously used in a study with Colombian women (Campo-Arias, Ayola-Castillo, Peinado-Valencia, Amor-Parra, & Cogollo, 2007) with appropriate internal reliability (α= .78). For the present sample, good internal reliability of the EPDS was obtained (age 3.5 α= .81; age 5 α= .83). Maternal depressive symptoms were included in the analyses of the four papers of this thesis to deal with possible reporting bias.

2.11.3. Research ethical considerations

This research was conducted following the ethical principles and code of conduct for social sciences from the American Psychiatric Association (APA, 2017), described in the declaration of ethical research aspects and intellectual property presented to the Psychology Department of La Sabana University (Appendix 2C). The Research and Ethics Committee endorsed the proposed methods for the present PhD study through minute number 102, May the 3rd 2017 (Appendix 2D). Informed consent (Appendix 2E) was signed by caregivers (mother, father, or grandmother) to authorise data collection and analyses, including its use for further publications. Research procedure and objectives were extensively described to participants, as well as data confidentiality which was ensured by using codes to identify participants. After concluding baseline and follow-up procedures, participants obtained information about the study overall results through an informative booklet.

2.11.4. Procedure

Baseline assessment. Home visits were scheduled with each family by phone call. The visit initiated socialising the informed consent with parents who signed it for participation's approval. Subsequently, one of the parents, mostly the mothers, completed the questionnaires. Then, standardised play and tidy-up tasks were carried out following the NICHD procedure. The visit finalised by giving an incentive to the child, including a book or didactic material. The overall procedure lasted approximately two hours.

Research assistants of the project were trained to carried out the study procedure. Training included roleplays and simulated situations for the standardised play and tidy-up procedures, scripts to get in touch with the participants, and questionnaires completion to identify possible queries from participants during the home visit. Two professionals in clinical psychology and five last year students from the Psychology programme at La Sabana University,

conducted the home visits from the Central Region. Assessments in the Pacific and Caribbean regions were carried out by professionals in psychology with experience in psychological assessment and previously trained.

For the PARCHISY, two Colombian professionals in psychology, referred to here as research assistants, were trained using a set of 20 videos already coded by experts from the Wirral study in the UK. Reliability was assessed in relation to the UK raters. The Intraclass Correlation Coefficients for research assistant 1 were: positive affect .82, reciprocity .85, negative affect .77, conflict .82. And for research assistant 2: positive affect .80, reciprocity .82, negative affect .80, conflict .79. After assistants were reliable, they coded an initial set of 40 Colombian videos, including participants from each region. Interclass Correlation Coefficients between raters in those scales that were included in the analyses was acceptable to good: positive affect ICC= .78, negative affect ICC= .70 and reciprocity ICC= .80. The remaining 195 videos were coded by one of the trained assistants.

Reliability process for the DPICS label and unlabelled praise scales was also completed by a research assistant using a set of 40 videos from the UK. Colombian videos were coded as indicated in the DPICS by giving one mark for each instance in which maternal praise was observed.

Database update. After ten months of baseline assessments, participants were contacted by phone call to update contact information and to inquire whether they agree to participate in a further assessment. Contact was made with 224 of the participants (95.3%) from the initial sample, who agreed to be part of a second assessment. The remain eleven families were also considered for the follow-up and were further contacted.

Follow-up. A second assessment was carried out with the participation of 220 families (93.6%) from baseline assessment. Participants were contacted 18 months after the initial visit to complete the same questionnaires and sociodemographic information. In this opportunity, the standardised play procedure was not included. Questionnaires digital versions were completed

by one parent, mainly mothers, in the family household or using a link sent by e-mail. The second strategy was mostly used for middle/high-income families, while home visits were completed with low-income families due to possible internet restrictions and to support questionnaires completion. The follow-up was conducted in the Central Region by six last-year students of the Psychology programme at La Sabana University and one professional research assistant. Assessments in the Caribbean and Pacific regions were conducted by me.

For this assessment, families were contacted by message to inform that a research assistant will call to invite them to participate in a second assessment. During the phone call, the procedure was explained, and the home visit was scheduled. Participants were also informed about the incentive for their participation: low-income families obtained $30.000 Colombian pesos, which represent the payment for a day work journey, and middle/high-income families obtained toys, books, or didactic material for their children. For those participants that were visited in their households, the digital version of the questionnaires was presented using tablets with internet connection. Items regarding participants exposure to community violence were included. Follow-up assessment finished by giving or sending to the families an informative booklet with general results from the baseline assessments.

2.12. References

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2.13. Appendix

2A. Alabama Parenting Questionnaire Spanish version

The Alabama Parenting Questionnaire Spanish version from De la Osa, Granero, Penelo, Domènech, & Ezpeleta (2014)

1. Tiene una conversación amigable con su hijo.
2. Le dice a su hijo cuando él o ella está haciendo un buen rabajo con algo.
3. Amenaza a su hijo con que lo va a castigar, pero no lo castiga.
4. Se presta de voluntario para ayudar con actividades en las que su hijo está involucrado (como deportes, grupos de niños de la iglesia).
5. Premia o le da cosas extras a su hijo por obedecerlo o por portarse bien.
6. Su hijo no le deja saber a donde va.
7. Juega juegos divertidos o hace otras cosas divertidas con su hijo.
8. Su hijo le convence de que no lo castigue después de que ha hecho algo malo o incorrecto.
9. Le pregunta a su hijo acerca de como estuvo su día en la escuela.
10. Su hijo se queda fuera de la casa en las noches pasada la hora de regresar a casa.
11. Ayuda a su hijo con sus tareas escolares.
12. Se siente que el lograr que su hijo le obedezca es más problema del que desea enfrentar.
13. Halaga a su hijo cuando hace algo bien.
14. Le pregunta a su hijo cuales son sus planes para el próximo día.
15. Lleva a su niño en auto a una actividad especial.
16. Halaga a su hijo si se porta bien.
17. Su hijo sale con amigos que usted no conoce.
18. Le da abrazos o besos a su hijo cuando hace algo bien hecho.
19. Su hijo sale sin tener hora fija para regresar.
20. Habla con su hijo acerca de sus amigos.
21. Su hijo está fuera de la casa al llegar la noche, sin compañía.
22. Le quita castigos a su hijo antes de tiempo (o sea, lo deja salir más temprano de lo que originalmente dijo).
23. Su hijo ayuda a planear actividades familiares.
24. Usted se pone tan ocupado que se le olvida donde está su hijo o qué está haciendo.
25. Su hijo no recibe castigo cuando hace algo malo o incorrecto.
26. Asiste a reuniones de la asociación de padres y maestros, conferencias de padres, u otras reuniones en la escuela de su hijo.
27. Usted le dice a su hijo que le gusta cuando él o ella ayuda en la casa.
28. Usted no chequea que su hijo haya llegado a casa cuando se supone que llegue.
29. Usted no le dice a su hijo a donde va.
30. Su hijo llega a casa de la escuela más de una hora después de lo que usted espera.
31. El castigo que le da a su hijo depende de su estado de ánimo.
32. Su hijo está en la casa sin supervisión de un adulto.
33. Le da nalgadas con la mano a su hijo cuando ha hecho algo malo o incorrecto.
34. Ignora a su hijo cuando se está portando mal.
35. Le da cachetadas a su hijo cuando ha hecho algo malo o incorrecto.
36. Le quita privilegios o dinero a su hijo como castigo.
37. Manda a su hijo a su cuarto como castigo.
38. Le pega a su hijo con un cinto (cinturón, correa), u otro objeto cuando él o ella ha hecho algo malo o incorrecto.
39. Le grita a su hijo cuando él o ella ha hecho algo malo o incorrecto.
40. Calmadamente le explica a su hijo por que su comportamiento está mal cuando él o ella se porta mal.
41. Usa el “tiempo fuera” (se sienta o para en la esquina) como un castigo.
42. Le da a su hijo quehaceres adicionales como castigo.

2B. PARCHISY Coding Sheet.

PARCHISY Coding Sheet for NICHD play and Tidy Up

Date: Study ID:
Coded by:

Behaviours Code	MOTHER CODES	
	Notes	Total Score (1 to 7)
Positive Content (control)	Encouragement, take the play forward, WH- Qs/ shall we? Negatively related to negative content/positively related to positive affect and responsiveness. A 5 requires at least 2 points of each category	
Praise (well done! very good!)		
Explanation (this is a till, you can use that for…)		
Open ended questions (what do you want to play with, what next?)		
Negative Content (control)	Intrusions in child's free will, parents taking over the play, harsh parenting, hostility (usually reflected on physical actions). NO TALLY for any safety/protection –related actions. Positively related to negative affect	
Touching child's hand/arm (manipulation of legs/hands)		
Criticism (don´t do that! Shaming, redirecting from wrong bag)		
Positive Affect (warmth)	Consistently over the play not just for minutes, is not about the content is about "how" Negatively related to negative affect. A 6 requires no more than 2 non-positive affect	
Smiling and Laughter (warm, friendly voice, inquisitive voice, looking at what the child is doing, very engaged)		
Negative Affect (expressions)	You are not getting a good impression of the parent. (Usually reflected on facial expressions). A 6 requires no more than 2 non-negative affect.	
Sarcasm		
Anger (irritation)		
Frowning (at what the child is doing, "that is silly, don't do that")		
Rejection (child's approaches or invitations to play		
Huffing		
Cold/harsh voice (often loud)		
Responsiveness	Also, response to child behaviours not only verbal questions. It can be physical or verbal. Positively related to "on task" and verbalizations. A 6 requires no more than 2 non-responsive action	
To child's questions (that's a till!)		
Comments (wow! Ooohhh! That's a great dance!)		
Expansions on comments		
Delayed/No Responses (ignoring child questions, own play activity, delayed response, not looking at child)		

Behaviours Code	DYADIC CODES (mother-child interactions)	
	Notes	Total Score (1 to 7)
Reciprocity (flow of ideas back and forth between them)	Related to responsiveness, positive content and positive affect. A 6 can't have more than 2 non-reciprocity actions	
Shared positive affect (Laughing together, enthusiasm to play)		
Eye contact (checking if the other is enjoying)		
Turn taking interaction (M: "hello Mr shopkeeper!", C: "hi, what do you want to buy?")		
Conflict Minor vs. Major	Positively related to negative content and negative affect/negatively related to cooperation. A 6 can't have more than 2 non-conflict actions	
Disagreement, arguing		
Shared negative affect (annoyance, irritation, frustrated)		
Tussling over toy (fighting to get a toy)		
Cooperation	Usually the parent does examples/ becomes a model in the child's play. Related to responsiveness and positive content (explanation). A 6 can't have more than 2 actions with lack of explicit cooperation	
Extent to which dyad are working together, engaged and behaviour is interdependent		
NOT engaged/working together		

TIDY UP

Behaviours Code	MOTHER CODES	
	Notes	Total Score (1 to 7)
Positive Content (control)	Encouragement, take the play forward, WH- Qs/ shall we? Negatively related to negative content/positively related to positive affect and responsiveness. A 5 requires at least 2 points of each category	
Praise (well done! very good!)		
Explanation (this is a till, you can use that for…)		
Open ended questions (what do you want to play with, what next?)		
Negative Content (control)	Intrusions in child's free will, parents taking over the play, harsh parenting, hostility (usually reflected on physical actions). NO TALLY for any safety/protection –related actions. Positively related to negative affect	
Touching child's hand/arm (manipulation of legs/hands)		
Criticism (don´t do that! Shaming, redirecting from wrong bag)		
Positive Affect (warmth)	Consistently over the play not just for minutes, is not about the content is about "how" Negatively related to negative affect. A 6 requires no more than 2 non-positive affect	
Smiling and Laughter (warm, friendly voice, inquisitive voice, looking at what the child is doing, very engaged)		
Negative Affect (expressions)	You are not getting a good impression of the parent. (Usually reflected on facial expressions). A 6 requires no more than 2 non-negative affect	
Sarcasm		
Anger (irritation)		

Frowning (at what the child is doing, "that is silly, don't do that")		
Rejection (child's approaches or invitations to play		
Huffing		
Cold/harsh voice (often loud)		
Responsiveness	Also, response to child behaviours not only verbal questions. It can be physical or verbal. Positively related to "on task" and verbalizations. A 6 requires no more than 2 non-responsive action	
To child's questions (that's a till!)		
Comments (wow! Ooohhh! That's a great dance!)		
Expansions on comments		
Delayed/No Responses (ignoring child questions, own play activity, delayed response, not looking at child)		

Behaviours Code	**DYADIC CODES (mother-child interactions)**	
	Notes	**Total Score (1 to 7)**
Reciprocity (flow of ideas back and forth between them)	Related to responsiveness, positive content and positive affect. A 6 can't have more than 2 non-reciprocity actions	
Shared positive affect (Laughing together, enthusiasm to play)		
Eye contact (checking if the other is enjoying)		
Turn taking interaction (M: "hello Mr shopkeeper!", C: "hi, what do you want to buy?")		
Conflict Minor vs. Major	Positively related to negative content and negative affect/negatively related to cooperation. A 6 can't have more than 2 non-conflict actions	
Disagreement, arguing		
Shared negative affect (annoyance, irritation, frustrated)		
Tussling over toy (fighting to get a toy)		
Cooperation	Usually the parent does examples/ becomes a model in the child's play. Related to responsiveness and positive content (explanation). A 6 can't have more than 2 actions with lack of explicit cooperation	
Extent to which dyad are working together, engaged and behaviour is interdependent		
NOT engaged/working together		

2C. Declaration of research ethical aspects and intellectual property for La Sabana University, Psychology Department.

Universidad de La Sabana

ANEXO 2

DECLARACIÓN DE ASPECTOS ÉTICOS Y DE PROPIEDAD INTELECTUAL DEL PROYECTO

Yo Diana Obando Posada investigador principal del proyecto titulado Interacciones Familiares y Desarrollo Emocional en Niños: Teoría de los Dominios Familiares de la facultad Psicología de la Universidad de La Sabana, declaro lo siguiente:

I. RIESGO:

i) En Humanos

La metodología del proyecto a mi cargo involucra los siguientes riesgos en humanos (identifique y describa el riesgo en cada uno de las categorías de acuerdo a la Resolución 8430 de 1993*: De la investigación en seres humanos Art. 11*):

Tipo de Riesgo	*Observaciones*
Sin riesgo	**no aplica**
Mínimo	**Privacidad de la identificación de los participantes**
Mayor que el mínimo	**no aplica**
Población subordinada o vulnerable (Art. 45 y 46)	**no aplica**

ii) En Otros

La metodología del proyecto a mi cargo involucra los siguientes riesgos en Animales (ley 84 de 1989), Ambiente, Biodiversidad (Decretos 309 de 2000 y 1375 y 1376 de 2013 del Ministerio del Medio Ambiente y Resolución 1348 de 2014) y OGMs (Resoluciones 3492 de 1998 y 2935 de 2001 del Instituto Colombiano Agropecuario)

Tipo de Riesgo	Animales	Ambiente	Biodiversidad	*OGMs*
Sin riesgo	**x**	**x**	**x**	**x**
Mínimo				
Mayor que el mínimo				

II. MANEJO DEL RIESGO:

A continuación establezco la manera en que se manejarán los riesgos identificados y los enmarco en la normatividad vigente:

INFORMACION	DESCRIPCION
Aspecto (s) de la metodología que involucra (n) riesgo*:	Privacidad de la identificación de los participantes puesto que se se hacen grabaciones y se solicita información personal de las familias
Medidas que se tomarán para minimizar los riesgos que implica la metodología del proyecto	Firma del consentimiento informado en el que se garantiza la confidencialidad de los datos de los participantes por medio del uso de códigos numéricos para las bases de datos. Así mismo, se pone en práctica la regulación acerca del secreto profesional de acuerdo con la ley del psicólogo.

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Normatividad vigente citada por el proyecto, en la cual se enmarcan las consideraciones propuestas:	Resolución 8430 de 1993 Ley 1090 de 2006, Ley del Psicólogo

III. AUTORIZACIÓN PREVIA:

A continuación indico los acuerdos a los que he llegado con cada una de las entidades participantes en el proyecto:

TIPO DE AUTORIZACIÓN	SI NO APLICA, EXPLICAR
Existe una autorización expresa y por escrito de las entidades involucradas en el seno de las cuales se van a entrevistar sujetos o a hacer observaciones para una investigación relacionada con algún aspecto organizacional o funcional de las mismas	No aplica
Existe un acuerdo expreso y por escrito con las entidades o personas que participan como sujetos de investigación de la manera como se hará la divulgación de los resultados.	Cada participante mayor de edad firma el consentimiento infromado para avalar su libre participación en el estudio. En el Consentimiento se informa y las personas acceden por medio de su firma a que los resulatdos sean socializados en artículos científicos sin que se revele información que identifique a los participantes.

La DIN podrá solicitar copia de los anteriores documentos debidamente firmados una vez el proyecto haya sido aprobado

IV. CONSENTIMIENTO INFORMADO

Se obtendrá el consentimiento informado cuando se requiera, de todos y cada uno de los sujetos participantes en el proyecto quienes firmarán el documento por el cual se garantiza que su participación será voluntaria y que están informados adecuadamente de la finalidad de la investigación; se indicará la garantía de confidencialidad de los datos obtenidos y de la identidad de los sujetos y quedará claro la posibilidad de retirarse libremente y en cualquier momento de la investigación. ***Para constancia de lo anterior anexo el formato de consentimiento informado que firmarán los sujetos participantes en esta investigación.***

V. CONFLICTO DE INTERESES[1]

A continuación relaciono todas las entidades y/o personas naturales, sean estos entes jurídicamente constituidos o no, privados o públicos, nacionales o internacionales, y cualquier otro actor que esté

[1] El conflicto de intereses se refiere a cualquier situación en la que se pueda percibir que un beneficio o interés personal o privado puede influir en el juicio o decisión profesional de relativo al cumplimiento de las obligaciones.

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involucrado en mi proyecto y con el cual eventualmente pueda presentarse un conflicto de intereses, y establezco el tipo de participación dentro del proyecto y las medidas para minimizar o manejar el conflicto:

Entidad, empresa, organización o cualquier otro ente jurídico o persona que participa en el proyecto (ENTE)	Tipo de participación	Posible conflicto	Medidas de manejo o prevención
No aplica			

Tipo de participación: financiadora, beneficiaria, co-ejecutora, aportante, otro.

No aplica	X

VI. PROPIEDAD INTELECTUAL

En este proyecto de investigación y en todos los documentos en los que se divulgan sus resultados, tendremos en cuenta y respetaremos la propiedad intelectual de aquellos que han trabajado previamente en el tema, haciendo la adecuada citación de trabajos y sus autores.

Entiendo, conozco y acojo el reglamento de propiedad intelectual de la Universidad de La Sabana, tanto en lo relacionado con derechos de autor como con propiedad industrial. Para todos los efectos, me comprometo a dar los créditos correspondientes a la Universidad de La Sabana.

A continuación describo el acuerdo al que hemos llegado con los terceros que participan en este proyecto, con relación a la propiedad intelectual (derechos de autor y/o derechos patrimoniales) de los resultados de esta investigación y a los posibles beneficios económicos que se deriven de este:

Entidad/Persona Natural	Acuerdo de propiedad intelectual
University of Reading	Universidad en la que estoy incrita como estudiante de Doctorado, estará en los créditos de las publicaciones
Profesor Jonathan Hill	Director de la tesis de grado y co-autor de las publicaciones que de allí se deriven
Universidad de La Sabana	Universidad que finanacia mis estudios Doctorales, se le dará crédito en las publicaciones

Fecha: 2 de mayo 2017

NOMBRE Y FIRMA INVESTIGADOR PRINCIPAL

No deje ningún campo sin diligenciar, en caso de que no aplique utilice NA.

2D. Ethical endorsement for PhD thesis from La Sabana University

Universidad de La Sabana

MEMORANDO

Chía, 23 de mayo de 2018.

PARA: Ms. Diana Paola Obando Posada, Profesora Asistente

DE: Dirección de Profesores e Investigación, Facultad de Psicología

ASUNTO: Aval ético de proyecto de disertación doctoral.

Apreciado Diana

Cordial saludo,

Por medio de la presente me permito comunicar que la Subcomisión de Investigación y Ética de la Facultad de Psicología, según acta 102 de la sesión del 03 de mayo de 2017, evaluó la integridad ética y calidad científica de su proyecto de disertación doctoral titulado: "Interacciones Familiares y Desarrollo de Problemas de Conducta en Niños Pequeños", desarrollado en el marco del programa Doctorado en Psicología de la Universidad de Reading – Reino Unido.

El concepto emitido luego de la evaluación realizada por un par interno de la subcomisión y analizada por el pleno de la SIE, fue favorable según lo cual la Facultad de Psicología avala y respalda la integridad ética del proyecto en mención.

Cordial saludo.

Universidad de La Sabana
Facultad de Psicología

Martha Rocío González Bernal. MSc. PhD.
Profesora asistente
Directora de Profesores e Investigación
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2E. Informed consent for caregivers.

Universidad de La Sabana

Código del participante [_____]

CONSENTIMIENTO INFORMADO

Este formato de consentimiento informado se dirige a los padres de los niños que han sido invitados a participar en la investigación "*Interacciones Familiares y Desarrollo Emocional en Niños*", cuyo objetivo es identificar las interacciones entre padres e hijos que se dan en el contexto familiar y establecer el efecto que estas tienen en el comportamiento de los niños.

La investigación está a cargo de la Psicóloga Clínica Diana Obando de la Universidad de La Sabana y del Doctor Jonathan Hill de la Universidad de Reading en Inglaterra. El proceso consiste en promover por medio del juego la interacción de uno de los padres con su hijo(a), la cual será grabada por un espacio de 20 minutos. Esta actividad se desarrollaría en su hogar en los espacios y horarios que ustedes consideren apropiados. Así mismo, serán aplicados 9 cuestionarios cortos que permitirán evaluar algunas características de ustedes como padres y del comportamiento de su hijo(a). Se espera realizar este procedimiento en máximo dos sesiones de 2 horas cada una. En una segunda fase de la investigación, ustedes serán contactados cuando su hijo(a) cumpla 5 años de edad con el objetivo de hacer seguimiento de los cambios en el comportamiento, por medio de la aplicación de 7 cuestionarios cortos en una sesión de dos horas aproximadamente.

La investigación garantiza total confidencialidad de sus datos personales y los de su hijo(a). Así mismo, se informa que la participación no implica ningún riesgo a nivel físico o psicológico para ustedes y es totalmente voluntaria, por lo cual se pueden retirar en el momento en que así lo consideren prudente. Como agradecimiento por su participación, los niños recibirán un obsequio de parte del grupo de investigación.

Este estudio busca avanzar en el conocimiento del comportamiento infantil con el objetivo de generar estrategias que permitan disminuir los altos índices de problemáticas de salud mental en la niñez a nivel mundial. Los resultados obtenidos serán socializados en artículos científicos, sin revelar los datos de identificación de los participantes como ya se indicó.

Nosotros, _____ identificado con CC No. _____ de la ciudad de _____, y _____ identificado con CC No. _____ de la ciudad de _____, autorizamos nuestra participación, así como la de nuestro hijo(a) _____ en la investigación descrita anteriormente. Así mismo, autorizamos a los investigadores a grabar en video las actividades del proyecto que así lo requieran, garantizando la confidencialidad de los videos, los cuales no serán socializados ni publicados de ninguna manera. Manifestamos que nos han explicado y hemos comprendido el objetivo de la investigación, la confidencialidad de nuestros datos personales, la voluntariedad en la participación y el uso de los resultados para la producción de artículos científicos.

Fecha: _____

Nombres: _____ y _____

Firma: _____ y _____

CC. CC.

Dirección domicilio: _____ Correo electrónico: _____

Teléfonos de contacto: _____

DIANA OBANDO POSADA
Profesor Asistente
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Chapter 3: Positive and negative parenting, Callous-unemotional traits and oppositional defiant disorder behaviours in preschool Colombian children

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Authors' contributions: All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Diana Obando, Jonathan Hill and Nicola Wright. Andrew Pickles performed analysis. The first draft of the manuscript was written by Diana Obando and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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3.1. Abstract

Against a background of a paucity of studies of Callous-Unemotional (CU) traits from outside High-Income Countries (HICs) we conducted a study in Colombia, a Low and Middle-Income Country (LMIC) to examine the psychometric properties of measures widely used in HICs, and then to test for specificity of associations between positive parenting and CU traits and negative parenting and ODD behaviours. In a cross-sectional study of 235 mothers of children aged 3.5 years (48% female; 14% Indigenous or Afro-Colombian) recruited through social media across three regions in Colombia, mothers reported on their parenting (Alabama Parenting Questionnaire; APQ), and on their children's CU traits (Inventory of Callous Unemotional Traits; ICU), and ODD behaviours (Child Behaviour Checklist; CBCL). Using confirmatory factor analysis, we replicated the factor structures of the ICU and APQ reported from HIC samples. In multiple linear regression, controlling for ODD behaviours, positive parenting (β= -.33, p<.001) but not negative parenting, was associated with lower CU traits. In equivalent models, inconsistent discipline (β= .25. p= < .001) and corporal punishment (β= .13, p= .049) but not positive parenting, were associated with ODD behaviours. The findings showed a clear demarcation in the associations between positive parenting and CU traits and negative parenting and ODD behaviours in preschool Colombian families. Directions of influence cannot be determined from this cross-sectional study. However, the findings provide support for distinctive mechanisms for CU traits and disruptive behaviour problems in young children, shared across HIC and LMIC settings.

Keywords: positive parenting; negative parenting; callous-unemotional traits; oppositional defiant disorder behaviours; children, preschool.

3.2. Introduction

The construct of Callous-Unemotional (CU) traits has proved highly productive in the identification of important heterogeneity within conduct problems (CPs), and hence in understanding their origins, and maintenance, and ultimately in the identification of appropriate treatments for these serious and often persistent disorders (Frick, Ray, Thornton, & Kahn, 2012). However, the overwhelming majority of studies into CU traits have been conducted in countries identified by the World Bank as High-Income Countries (HICs), and studies from Low and Middle-Income Countries (LMICs) are needed both to test the generalizability of the construct and the measures, and to broaden the empirical investigation of possible mechanisms. This study of Colombian families aimed to do both. With a focus on dimensions of parenting and CU traits, the first aim of the study was to establish the psychometric properties of two measures used widely in HICs but rarely in LMICs, the APQ (Frick, 1991) and the ICU (Frick, 2004). We examined the factor structures of both measures and compared them with those from HICs, noting whether using these measures in an LMIC setting posed similar or different questions to those reported from HICs. The second aim of the study was to ask for the first time in a LMIC setting, and in a study exclusively of preschool, and both male and female, children, whether there are specificities in associations between parenting dimensions and CU traits. Based on previous indications of differential roles for positive and negative parenting for CU traits and oppositional-defiant (ODD) behaviours, we examined whether positive parenting is associated with CU traits but not ODD behaviours, and negative parenting with ODD behaviours but not CU traits, in a cross-sectional study of Colombian parents and children aged 3.5 years.

Understanding the developmental origins of CPs in young children is crucial because these behaviours are strongly associated with later antisocial, and broader social and psychological dysfunction (Hill & Maughan, 2015; Odgers et al., 2008; Tremblay, 2010). While early onset, '*life-course persistent*', identifies problems with well characterized trajectories, there is increasing evidence that they also display substantial heterogeneity. This heterogeneity has

been characterized in a variety of ways including '*overt vs covert*', '*socialized vs unsocialized*' and according to the presence or absence of CU traits. CU traits are characterized by low empathy for others' distress and a lack of guilt regarding one's misbehaviour or aggression (Frick et al., 2014). CPs in children with CU traits have been linked to more severe and stable antisocial behaviour in childhood and adolescence (Frick et al., 2014) and with more severe violent and aggressive behaviour (Kruh, Frick, & Clements, 2005), supporting both the validity of the construct and its importance to understanding persistent and serious antisocial behaviours.

Several lines of evidence point to a role for reduced social engagement in CU traits. This may be the case very early in infancy with lower face preference at age 5 weeks associated with higher CU traits at age 2.5 years (Bedford, Pickles, Sharp, Wright, & Hill, 2015) and children's lower levels of gaze during parent child interactions with higher levels of CU traits (Bedford et al., 2017). Studies of children find that CU traits are associated with reduced eye contact with parents, generally and during an 'I love you task' (Dadds et al., 2014) suggesting reduced engagement with intimate social interactions that may promote empathy. Instructions to make eye contact improve emotion recognition in children with CU traits, suggesting a causal role for reduced eye contact (Dadds et al., 2012). An implication of these findings is that increased social engagement with parents may help protect against or lower CU traits.

Early parenting experiences likely to lead to increased social engagement have been found to be associated with lower CU traits. Findings from the *Wirral Child Health and Development Study* (WCHADS) indicate that early positive parenting is associated with lower CU traits (Bedford et al., 2015; Wright, Hill, Sharp, & Pickles, 2018). Using data derived from the NICHD play procedure at 29 weeks, we showed that maternal positivity and sensitivity to distress predicted CU traits assessed over 2.5, 3.5 and 5.0 years (Wright et al., 2018). Parental negativity, assessed as intrusiveness, did not predict CU traits and the effect was not mediated via attachment status at 14 months. In a study with later outcomes, Centifanti, Meins and Fernyhough (2016) found that mind-mindedness, indexing the mother's awareness of her

infant's states of mind, assessed at age 8 months predicted children's self-report of CU traits at 10 years. Parental sensitivity over the preschool period is also associated with lower CU traits. Using an index of parental sensitivity derived from parent-child observations at ages 24, 36, and 58 months, Wagner, Mills-Koonce, Willoughby, Zvara and Cox (2015) found that less sensitive parenting predicted higher levels of CU traits in first grade controlling for earlier measures of CU behaviours. In a subsequent publication from the same sample, Wagner et al. (2019) found that less sensitive parenting, assessed at 6 and 15 months, was associated with both lower CU traits and CPs at first grade. The association between sensitive parenting and CPs was moderated by cortisol reactivity in infancy, with lower sensitive parenting and higher cortisol reactivity predicting higher CPs. In this study, harsh intrusion did not significantly predict later CPs.

Parental behaviours in relation to playful bids are likely to be the most relevant with infants, but once children acquire the capacity for opposition and aggression, parental practices in relation to child prosocial and antisocial behaviours may also become important. Here, in contrast to harsh, inconsistent, or physically abusive parenting associated with CPs in general (Gershoff, 2002; Patterson, 2002), it may be that the positive reinforcement capitalising on the reward dominant response style found in relation to CU traits is the most important discipline dimension for reducing CU traits (Clark & Frick, 2016; Kochanska, Kim, Boldt, & Yoon, 2013). Previous studies examining both parental involvement with children's activities and positive reinforcement for prosocial behaviours have reported independent associations with both dimensions, supporting their distinct contributions to lowering CU traits (Frick et al., 2003; Hawes, Dadds, Frost, & Hasking, 2011). In a large study (N= 561) that addressed potential genetic confounds using an adoption design, adoptive mothers observed positive reinforcement at 18 months significantly predicted child CU traits at 27 months after accounting for ODD (Waller et al., 2016). It should be noted that not all studies of parenting and CU traits have been consistent with these proposals. In a large prospective study of 2-year-old children (N= 731) with observational and self-report measures of parenting, dimensions of harsh but not

positive parenting, significantly predicted CU traits at ages 3 and 4 years (Waller et al., 2012), although higher maternal "*positive behavioural support*" (a composite of positive reinforcement and involvement) was associated with lower CU traits.

Taken together, the studies summarized here are consistent with the specificity hypothesis. However, specificity both of parenting dimensions and of child behaviours in the same analyses provides the best test of this hypothesis. In a prospective study, Waller, Shaw and Hyde (2017) examined prediction from observed warm and harsh parenting at age 24 months to CU traits at 42 months and CU traits at 10-12 years in the Pittsburgh Youth Study boys sample. CU traits were assessed using the CBCL and thus modelled as a three-correlated factor outcome with ODD and ADHD. Consistent with the specificity hypothesis, Waller et al. found that warm but not harsh parenting predicted CU traits at 42 months, and there was an indirect effect of positive parenting on age 10-12 years CU traits via age 42 months CU traits, after accounting for age 10-12 years delinquency. Specificity was also examined to CU traits assessed at first grade in the Family Life Project, in an analysis testing for the unique effects of observed sensitive parenting and harsh-intrusive parenting, as well as household chaos and socioeconomic status (SES), assessed over the first 3 years of life on later CU traits and CPs (Mills-Koonce et al., 2015). In contrast to the specificity hypothesis, observed sensitive parenting predicted later CPs and observed harsh-intrusive parenting predicted later CU traits. There was weak evidence that both sensitive and harsh-intrusive parenting mediated the effect of household chaos and SES on both CPs and CU traits. Another prospective study examined specificity from mid-childhood to early adolescence. In the Fast-Track study parental warmth assessed when children were aged 6-7 years but not harshness, predicted CU traits but not CPs, and harshness but not warmth, predicted CPs but not CU traits (Pasalich, Witkiewitz, McMahon, Pinderhughes, & Conduct Problems Prevention Research Group, 2015). One cross-sectional study has been reported in younger children. In a sample of children aged 2-7 years (mean age 6 years; N= 94), Clark and Frick (2016) tested cross-sectional associations between positive and negative parenting and

both CU traits and ODD behaviours. They did not find an association between negative parenting and ODD behaviours, but parental warmth and not negative parenting, was associated with lower CU traits controlling for ODD symptoms. Finally, evidence for the specificity hypothesis has been provided from a cross-sectional twin-difference study of children age 6-11 years (mean age 7 years). Warm but not harsh parenting was associated with child CU traits, whereas harsh but not warm parenting was associated with child aggressive behaviour (Waller, Hyde, Klump, & Burt, 2018).

The majority of research examining early appearing CPs has focused on samples from HICs. Epidemiological studies in Latin American countries such as Brazil and Chile indicate that CPs are the most common child mental health problem (Anselmi, Fleitlich-Bilyk, Menezes, Araújo, & Rohde, 2010; Vicente et al., 2012). The most recent mental health survey in Colombia indicated that the twelve-month incidence of CPs in children was 8% (Encuesta Nacional de Salud Mental, 2015), which is slightly higher than the UK prevalence rate of 6% (Green, Meltzer, Form & Goodman, 2005). Very little is known about CU traits outside of HIC settings; a search using the term '*Callous-Unemotional traits*' on 29/03/20 yielded 720 publications of which 15 were from LMICs, 2% (11) from China. As a consequence, evidence is lacking regarding the psychometric properties and of the validity of established CU traits measures, and of links to parenting dimensions, outside of HICs.

The self-report ICU has been shown to have a bi-factor structure in adolescent HIC samples, with items loading on three subscales (uncaring, callousness and unemotional) and also on a general CU factor, often with method factors included reflecting the positive and negative item direction wording (Essau, Sasagawa, & Frick, 2006; Kimonis et al., 2008; Kleim et al., 2019; Paiva-Salisbury, Gill, & Stickle, 2017). Waller et al. (2015) found support for a modified bi-factor structure with the parent-report ICU in a sample of high-risk 9-year-old. However, other studies of the parent-report ICU with pre- and school-aged HIC samples have failed to support a bi-factor structure, instead indicating two-correlated factor solutions (Willoughby et

al., 2015; Hawes et al., 2014; Houghton, Hunter, & Crow, 2013) or a three-correlated factor structure (Ezpeleta, de la Osa, Granero, Penelo, & Domènech, 2013). The two-factor solutions generally reflect the callous and uncaring dimensions, which have been shown to have good validity (Hawes et al., 2014; Kimonis et al., 2016). However, the two-factor solution probably arises because items on one scale are worded negatively and on the other scale, positively (Ray, Frick, Thornton, Steinberg, & Cauffman, 2016). On this basis, the ICU authors have argued strongly for use of the total score only (Ray et al., 2016). The unemotional subscale has repeatedly shown divergent associations with expected correlates, and it has been suggested that it does not adequately capture the unemotional component of CU traits (Hawes et al., 2014; Waller, Hyde, Grabell, Alves, & Olson, 2015), which negates the use of three-factor solutions. In a recent study of preschool children, the 12-item two correlated factor structure showed the best fit to the data, but both the 24-item and 12-item scales showed very similar convergent and discriminant validity (Kimonis et al., 2016).

A small number of studies in LMIC settings have used established measures of CU traits. Studies of the self-report ICU in adolescents in South Africa (Nwafor, Onyeizugbo, & Anazonwu, 2015; Nwafor, Ibeagh, Anazonwu, & Obi-Nwosu, 2019) and Mexico (Amador, Fernandez, Galvan, Resendiz, & Padros, 2017; Amador & Padros, 2019) have reported similar but somewhat lower internal reliability and similar levels of CU traits to those from HICs, and Nwafor and colleagues have provided evidence for the validity of the ICU in relation to aggression and bullying. These studies subjected the ICU to factor analysis but did not test the factor structures reported from HICs, instead testing a three-correlated factor structure (Nwafor et al., 2015) and using Exploratory Factor Analysis (EFA) to develop a revised shorter scale (Amador et al., 2017).

The factor structure of both the self- and parent-report ICU has been examined in a number of studies from China. Wang et al. (2019) tested competing factor structures of the parent, teacher and self-report versions of the ICU proposed from HIC's on sample of children

aged 6-12 years (N= 977) and tested longitudinal measurement invariance. Wang et al. found the best fitting structure to be a two correlated factor 11-item version based on Hawes et al. (2014) but excluding one item which was drawn from the unemotional subscale. Two studies of Chinese samples, one with detained adolescents (Zhang et al., 2019) and one with university students (Wang et al., 2017), had previously found this 11-item solution to show the best fit. Zhang et al. suggested that the unemotional scale may have less relevance in Chinese culture where emotional expression is less encouraged compared to Western cultures. This 11-item factor structure on the self-report scale was then tested in a cross-cultural study of UK (age 11-14 years) and Chinese (age 10-13 years) children and was found to show the best fit in the UK sample, and showed weak cross-cultural measurement invariance. Evidence for the validity of this 11-item ICU has been provided by Zhang et al. who reported cross-sectional associations with aggression in a sample of Chinese detained adolescents. In a publication from this sample, we have provided evidence for the validity of the full ICU and the 12-item scale using a common test of 'incremental' validity, showing that CU traits assessed at age 3.5 years predicted child aggression at age 5.0 years, controlling for age 3.5 years aggression (Obando et al., 2020). In the present study we examine the competing proposed factor structures of the ICU.

While associations between parenting and CU traits and CPs have not been examined outside of HIC settings, studies do indicate cross-cultural differences in parenting practices that may be relevant. Focusing on Colombia, the setting for the study reported here, the evidence suggests that Colombian parents possess more authoritarian attitudes to parenting (attitudes which emphasize strictness, respect for authority, and obedience) and that they use more physical punishment (Bornstein, Hahn, & Haynes, 2011; Lansford et al., 2010) compared to the grand mean across nine different HIC and LMIC societies (China, Colombia, Italy, Jordan, Kenya, the Philippines, Sweden, Thailand, or the United States).

Crucially for the study of links between parenting practices and child CPs, there is some evidence that cultural normativeness of corporal punishment moderates the association with

child adjustment, such that the positive association between physical punishment and child maladjustment is weaker when cultural normativeness of punishment is higher (Gershoff et al., 2010). However, in a cross-cultural comparison study of Colombia and nine other countries there was no significant difference across countries in the association between parent reported physical punishment and child aggression (Lansford et al., 2010). Regarding parental warmth, in the same cross-country comparison, Colombian parents were amongst the countries showing the highest levels of warmth (Deater-Deckard et al., 2011) and there were no significant differences across countries in the association between child reported parental warmth and child aggression (Lansford et al., 2010) nor in the association between parental warmth and child prosocial behaviour (Putnick et al., 2018). Therefore, while the rates of different parenting practices may differ across HICs and Colombia, the limited evidence suggests that the associations between parenting and child behavioural and social outcomes should be similar.

In this study we use a commonly used self-report measure of parenting, the APQ, which assesses aspects of parenting relevant to CPs in school-age children, including positive reinforcement, parental involvement, parental monitoring/supervision, inconsistent discipline, and corporal punishment (Frick, 1991). Studies using Confirmatory Factor Analysis (CFA) with school-aged children and adolescent have supported a five-factor structure (Essau et al., 2006; Święcicka, Wozniak-Prus, Gambin & Stolarski, 2019), whereas studies employing EFA have most commonly supported a three-factor structure with the two positive dimensions combined, and the corporal punishment scale eliminated (August, Lee, Bloomquist, Realmuto, & Hektner, 2003; Elgar, Waschbusch, Dadds, & Sigvaldason, 2007; Hinshaw et al., 2000; Molineuvo, Pardo, & Torrubia, 2011, but see Robert, 2009). The APQ was developed for school-age children and the parental monitoring scale has limited relevance to younger children who are unlikely to be out of the house unsupervised.

A preschool version of the APQ was proposed by Clerkin, Halperin, Marks and Policaro (2007) in a sample of 160 3–6-year-old children. They removed 10 items deemed inappropriate

for preschool children (8/10 from the parental monitoring scale) and accepted a three-factor structure of inconsistent parenting, punitive practices, and positive parenting, which was supported by De la Osa, Granero, Penelo, Domènech and Ezpeleta (2014) with a sample of 622 Spanish children aged 3 years. Punitive practices comprised the corporal punishment items plus two additional '*other discipline'* items which were not intended to contribute to the subscales. Whilst to our knowledge no study of the factor structure of the APQ has been conducted in a LMIC, a study with a Latin American sample of Chilean pre-schoolers (N= 522; Cova et al., 2017) has supported the four-factor structure (omitting parental monitoring) using CFA. Further, Robert (2009), which supported the original five-factor structure using EFA with 11–12-year old's, was a study of Mexican children.

In this study we sought to examine whether specificity of parenting dimensions in relation to CU traits and ODD symptoms is evident during the preschool period. By examining the psychometric properties of commonly used measures of parenting and CU traits, and going on to test specificity hypotheses, in Colombia, an LMIC, we aim to extend generalisability of findings on this topic beyond HICs. We first examined whether the factor structure of the CU traits and parenting measures identified in HIC studies are also seen in Colombia. Second, we tested the hypothesis that higher positive parenting is associated with lower CU traits after controlling for ODD behaviours, with no association between negative parenting and CU traits. Third we hypothesised that negative parenting is associated with higher ODD behaviours after controlling for CU traits, with no association between positive parenting ODD behaviours.

3.3. Methods

3.3.1. Participants and Procedure

The data reported in this paper were acquired during baseline assessments for a prospective study of parent-child interactions and externalising outcomes over the ages 3.5 to 5.0 years in Colombia. We aimed to identify a diverse sample by recruiting from regions with different cultural and socio-demographic characteristics and by using social media accessed by the majority of the population of childbearing age. Of the three regions from which we recruited participants, two, the Pacific and Caribbean, are characterized by high levels of poverty, and substantial numbers of Afro-Colombian and Indigenous inhabitants (Ministerio de Ambiente y Desarrollo Sostenible, 2013). By contrast, the Central region has the lowest levels of poverty in the country, and it is predominantly mestizo (mix of European and Indigenous).

Participants were recruited through Facebook groups with titles that suggested they were likely to include a large number of women with young children, such as '*Latin Women League*' and '*More Moms Colombia*'. Facebook use is very high in the population between 14 and 65 years old, estimated to be 91% of the Colombian population (Ministerio de Tecnologías de la Información y las Comunicaciones, 2018) with use among young adults likely to be higher. A total of 344 parents responded to the Facebook invitation, and were called by research assistants to discuss participation. The children of 40 of those who responded were outside of the age range and were not included, leaving 304 eligible for participation. Of these 304, 235 (77.3%) agreed to take part and provided full data. Reasons for non-participation included that contact could not be made by phone, parents were too busy to attend for an assessment, or families had concerns about security due to the country's increased levels of criminality.

The sample consisted of children from 2.10 to 4.2 years old (M= 3.3., SD= .48), 48% girls. The mothers' average age was 30.0 years (SD= 6.29) and for fathers was 33.1 (SD= 7.57). There were 96 families from the Central region, 70 from the Caribbean and 69 from the Pacific region, and overall, 15% lived in rural areas. In the majority (77%) of families there were two

parents and 50% of mothers and 48% of fathers had university degrees. Family socioeconomic status (SES) was defined according to the Colombian government classification (Departamento Administrativo Nacional de Estadística - DANE, 2011) designed to bill for public utilities and facilitate the distribution of subsidy programs. This system classifies households into six categories (1 the lowest) by evaluating each individual home's wealth, housing conditions and availability and quality of housing, and basic public services such as sewerage and water supply. This system is widely used in Colombian public health research (Buitrago-Lopez et al., 2015). On the basis that the Colombian government provides subsidies for those in categories 1 and 2, we created a binary variable representing low SES of categories 1-2 vs 3-6. By this criterion, 45% of the sample was of low SES, which is similar to other published studies (Buitrago-Lopez et al., 2015). The families identified as mestizo (38%), Afro-Colombian (9%), Indigenous (5%), and from 'other' ethnic groups (13%). The remaining 35% did not identify themselves as belonging to a specific ethnic group. Just over a third of the sample (35%) reported being victims of or exposed to community violence, including guerrilla violence, or experiencing forced displacement.

The study was approved by the Research and Ethical Committee of the Psychology Department at La Sabana University in Colombia at meeting number 102 on 3rd May 2017. Participants who agreed to hear more about the study by phone were visited at home, where the study was explained in more detail and informed consent was obtained. Parents completed questionnaires and participated in standardized assessments of play and tidy-up for the prospective study.

3.3.2. Measures

The first part of this study focused on HIC and LMIC comparisons, comparing psychometric properties of the ICU and APQ, therefore no observational measures were used. The second part was a replication of the Clark and Frick paper in 2016, which only used parent report measures.

Alabama Parenting Questionnaire (Frick, 1991; Spanish version, Servera, 2007). The original APQ comprises 42 items yielding five subscales: positive reinforcement, positive involvement, poor monitoring, inconsistent discipline, and corporal punishment. Seven "*other discipline*" items do not contribute to the subscales and instead function to reduce a negative bias towards the corporal punishment items. Each item is scored on a 5-point scale (1= never, 2= almost never, 3= sometimes, 4= often, and 5= always). As the parental monitoring subscale is not relevant to preschool children, we test the fit of a four-factor solution, and a three-factor solution where the two positive parenting dimensions are combined (as in Clerkin et al., 2007). Consistent with Cova et al. (2017) we omitted the two '*other discipline*' items added to the corporal punishment scale by Clerkin et al., preferring to only include items which were designed to contribute to the subscales.

Inventory of Callous–Unemotional Traits (ICU; Frick, 2004). The parent report version of the ICU has 24 items scored using a 4-point scale (0= not at all true, 1= somewhat true, 3= very true, and 4= definitely true). The Spanish version of the inventory was shared by the authors, who also approved its use in the present study. We tested the main proposed factor structures in the HIC literature: one factor, three correlated factors, three factor bi-factor (Kimonis et al., 2008), three factor bi-factor with method factors (Kleim et al., 2019; Paiva-Salisbury et al., 2017), 12-item two-correlated factor (Hawes et al., 2014), 16 item two-correlated factor (Houghton et al., 2013) and 24-item two-correlated factor (Willoughby et al., 2015).

Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsy, 1987). The EPDS is a 10 item self-report measure of depressive symptomatology widely used during the prenatal and postnatal periods. It is also widely used with parents of young children because they are commonly pregnant or have recently given birth to further children (Huntley, Wright, Pickles, Sharp, & Hill, 2017). The EPDS has been used in previous research with Colombian

females (Campo-Arias, Ayola-Castillo, Peinado-Valencia, Amor-Parra, & Cogollo, 2007) with an internal reliability of α= .78. For the present sample the internal reliability was α= .81.

Child Behaviour Checklist age 1.5-5 years (CBCL; Achenbach & Rescorla, 2001). The Spanish version of the age 1.5-5 years CBCL was used. The CBCL has 99 items covering a wide range of internalising and externalising behaviours. The questionnaire was completed by one of the parents (mostly by mothers 92% and a minority by fathers 6% and grandmothers 2%) who were asked to rate the past 6 months' child behaviour. Each item uses a 3-point scale (0= not true, 1= somewhat true or sometimes true, and 2= very true or often true). The 6 item DSM-IV oriented Oppositional Defiant (ODD) behaviours scale was used in this study. For the present study the scale had an internal consistency of α= .75 which is comparable to α= .69 for ODD behaviours reported previously with Colombian children (Hewitt, Vila, & Juárez, 2016). The CBCL factor structure has been replicated in multiple different LMIC's (Resorla et al., 2012).

3.3.3. Data analyses

The Confirmatory Factor Analysis (CFA) on the ICU and APQ scales was conducted in Mplus version 8 (Muthen & Muthen, 2017), using the weighted least squares means and variances (WLSMV) estimator for categorical data. CFA was used to test different factor structures for the ICU and APQ identified in previous studies. Fit was assessed using the Root Mean Square Error (RMSEA) and Comparative Fit Index (CFI) statistics, with values of below .60 and above .90 considered to indicate adequate model fit (Hu & Bentler, 1999). The rest of the analyses were conducted using the SPSS statistical package v. 24 (IBM, 2016). Bivariate associations were examined using Spearman correlation coefficients, as the distributions of CU traits and ODD variables were skewed. For hierarchical multiple linear regression analyses this was corrected by square root transformation. The independent contributions of parenting practices were examined in separate models by regressing transformed CU traits and then ODD behaviours on to APQ dimensions. Following Clark and Frick (2016), the specificity of the associations was examined by controlling for CU traits in the model predicting ODD behaviours

and controlling for ODD behaviours in the model predicting CU traits. Region was entered as two dummy variables, Caribbean vs others, Pacific vs others. Maternal depressive symptoms were included to reduce mood related reporter bias.

Variables were entered in three blocks, with change of explained variance as the criterion of whether the added variables produced a significant improvement in the model. In all models, demographic variables and maternal mood were entered in the first block. In the model with CU traits as the dependent variable, ODD behaviours were also entered in the first block, with the parenting variables that we predicted would not be associated with CU traits (dimensions of negative parenting) in the second block, and the dimensions of positive parenting entered in the third block. With ODD behaviours the reverse was the case, with CU traits entered in the first block, positive parenting dimensions in the second block and negative dimensions in the third block.

3.4. Results

3.4.1. Confirmatory factor structure of the ICU

We tested the factor structures of the parent-report ICU that have been examined in other studies, including: one factor, three correlated factors, three factor bi-factor (Kimonis et al., 2008), three factor bi-factor with method factors (Kleim et al., 2019; Paiva-Salisbury et al., 2017), 12-item two-correlated factor (Hawes et al., 2014), 11-item two correlated factors (Wang et al., 2019), 16-item two-correlated factor (Houghton et al., 2013) and 24-item two-correlated factor (Willoughby et al., 2015). The model fit statistics are presented in Table 1. Item 10 ("Does not let feelings control him/her") often shows a negative factor loading (e.g., Waller et al., 2014) and that was the case in this study and so it was dropped after model 1. In this sample, items 7 and 9 showed low factor loadings and small and sometimes negative inter-item correlations with other items, and so the one and three factor models were tested with these items removed.

Table 1

Model fit information for the different factor structures of the ICU.

Model	$\chi^2$2(df)	CFI	RMSEA	Item factor loadings <.4	MI >20	Notes
1. 1 factor (all items on one factor)	632.83 (252) p<.001	.79	.08	#7 (.20), #9 (.13), #10 (-.05), #18 (.29), #20 (.34)		
2. 1 factor -#10 removed	604.78 (230) p<.001	.79	.09	#7 (.20), #9 (.13), #18 (.29), #20 (.34)		
3. 1 factor – all 4 low loading items removed	531.85 (170) p<.001	.80	.10	#11 (.35), #20 (.32)		
4. 3 correlated factors (no #10) (Ezpeleta et al., 2013)	456.624 (227) p<.001	.87	.07	#9 (.19) on Cal, #7 (.24) on Cal, #18 (.35) on Cal	UnC by #8= 40.65; UnC by #22= 33.47; UnE by #8= 24.60	UnC with UnE .56, UnC with Cal .62, Cal with UnE.73
5. 3 correlated factors (without, #10, #7 and #9)	405.234 (186) p<.001	.87	.07	#18 (.34) on Cal, #20 (.38) on Cl		UnC with UnE .56, UnC with Cal .64, Cal with UnE .76

6. Bi-factor model (Kimonis et al., 2008)						Non-positive definite warning
7. Bi-factor model no #10, #7 or #9 in the model						Not identified
8. Bi-factor model, no #10, #7 and #9 on general CU factor only						No convergence
9. Bi-factor model with negative wording factor						No convergence
10. Bi-factor model with positive and negative wording factors						No convergence
11. 2 correlated factors 12 item (Hawes et al., 2014)	101.368 (53) p<.001	.94	.06	#9 (.26) on Cal		Two factors correlated .45
12. 2 correlated factors 12 item with bi-factor						Not identified
13. 2 correlated factor 11 item (Wang et al., 2019)	84.930 (43) p<.001	.94	.06	#9 (.28)		
14. 2 correlated factors (Willoughby et al., 2015)	450.437 (251) p<.001	.90	.06	#7 (.26) on Cal, #9 (.27) on Cal, #18 (.39) on Cal #10 (-.11) on empathic /prosocial	None	Two factors correlated .43
15. 2 correlated factors (Houghton et al., 2013)	204.923 (103) p<.001	.91	.07	#7 (.24) on Cal #9 (.23) on Cal #18 (.24) on Cal	UnC by #8= 42.85	Two factors correlated .60

Note. UnC = Uncaring, UnE = Unemotional, Cal = Callous.

Similar to Willoughby et al. (2015), the bi-factor model proposed by Kimonis et al. (2008) showed a non-positive definite warning in this sample, and all other bi-factor models either failed to converge or were not identified. Acceptable model fit was only found for the four

different two-correlated factor structures proposed. Both the Hawes et al. (2014) 12-item and the Wang et al. (2019) reduced 11-item solution proposed showed the best fit to this data, the models showed acceptable fit, all but one factor loadings were >.40 and there were no MI's. We selected the Hawes et al. (2014) 12-item solution retaining item 6 "Does not show emotions" which showed a moderately high factor loading in this sample, and the 12-item solution has previously been shown to be valid and reliable in preschool children. This model and the factor loadings are presented in Figure 1. Taking account of Ray et al. and Kimonis et al. (2016), we conducted our primary analysis with the 24-item total and report the analysis using the 12-item total in the Appendix. The 24-item total showed good internal consistency (α= .82), and the 12-item total showed adequate internal consistency (α= .71). Items 9 and 18 evidenced lower factor loadings in this sample compared to previous samples, and both evidenced item-to total scale correlations <.30 which contributed to the poorer Alpha observed for the 12-item total in this study.

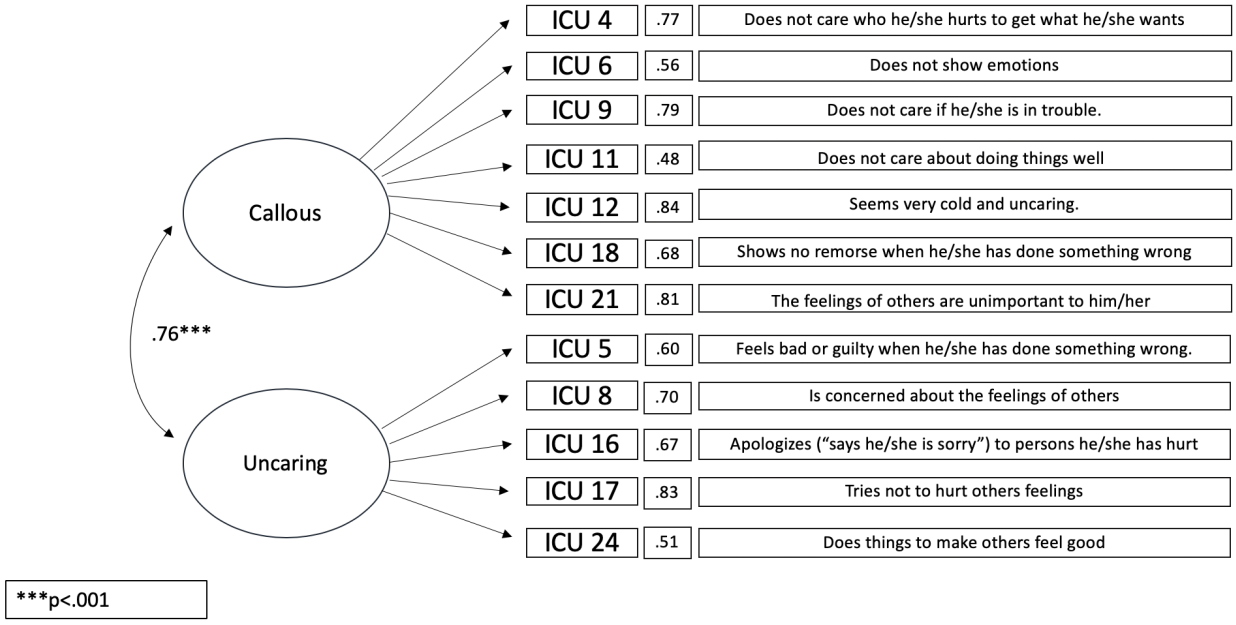

Figure 1. Inventory of Callous-unemotional traits 12-item model and factor loadings.

3.4.2. Confirmatory factor structure of the APQ

The three- and four-factor models both showed poor fit to the data (three-factor: $\chi 2$ (168)= 748.25, p<.001, RMSEA= .11, CFI= .71; four-factor: $\chi 2$ (183)= 629.20, p<.001, RMSEA= .10, CFI= .77). In the three-factor model, item 7 ("Your child talks you out of being punished after he/she has done something wrong") showed a negative loading of -.31 on the inconsistent discipline factor and a large modification index (MI) to load on the positive parenting factor. Large MI's were also observed for two items from the original positive reinforcement scale (item 5 "You reward or give something extra to your child for obeying you or behaving well" and item 14 "You praise your child if he/she behaves well") to load on the inconsistent discipline and corporal punishment factors, and the two items were highly inter-correlated (r= .78). In previous factor analytic studies, item 5 has been found to also load on discipline factors (Clerkin et al., 2007), and this item was not included in the three-factor solution accepted by Clerkin et al. The removal of item 5 and item 7 improved the model fit to acceptable ($\chi 2$ (149)= 236.28, p<.001, RMSEA= .05, CFI= .94, TLI= .93) but item 14 showed a low and non-significant factor loading on the positive parenting factor (est= .09, p= .199) and MI's > 20 to load on the two negative parenting factors. After removal of item 14, the model showed good fit ($\chi 2$ (149)= 196.97, p< .001, RMSEA= .05, CFI= .95, TLI= .95), all factor loadings were >.40, except for one item on the inconsistent discipline factor and there were no MI's >20. The standardized factor loadings and inter-factor correlations are shown in Figure 2.

Items 7, 5 and 14 showed the same issues in the four-factor model, removal of these three items improved the model fit to good ($\chi 2$ (129)= 191.40, p<.001, RMSEA= .05, CFI= .96, TLI= .95) and there were no MI's >20. However, the correlation between the two positive parenting scales was r= .91. Despite the four-factor model showing the best fit to the data, the very high correlation between the two positive scales suggests that they were not adequately distinguishable in this sample, and therefore the three-factor solution depicted in Figure 2 was accepted as the best fitting model. Summed total scores for positive parenting (10 items),

inconsistent discipline (5 items) and corporal punishment (3 items) were used in the following analysis. The Cronbach's Alpha was .77, .55 and .46 respectively for the three scales.

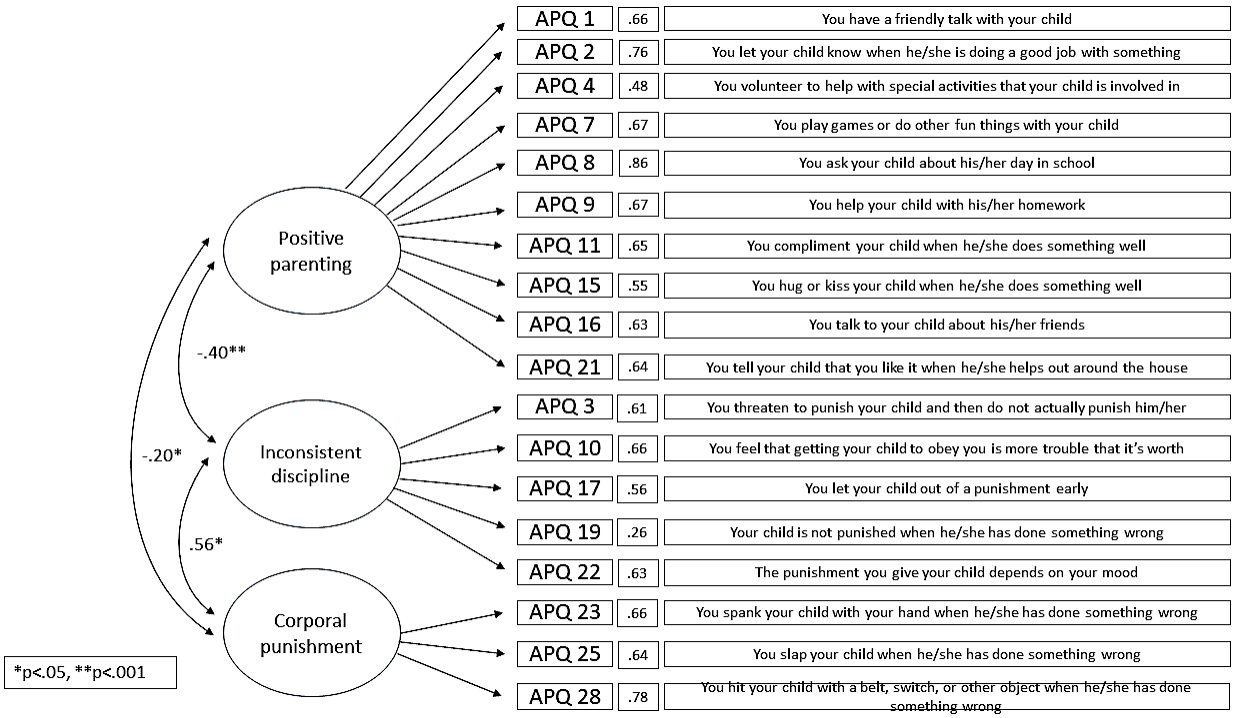

Figure 2. Alabama Parenting Questionnaire standardised factor loadings and inter-factor correlations.

3.4.3. Descriptive statistics and bivariate associations

Mean parenting and symptom scores, and bivariate associations between the variables are shown in Table 2. While there were moderate positive associations between scales of negative parenting and of positive parenting, positive parenting was, as predicted, associated with lower CU traits. However, parental inconsistency was also associated with CU traits. Similarly, negative parenting dimensions were associated with higher ODD scores but so also was lower positive parenting. The association between CU traits and ODD behaviours was moderate, underlining the value of controlling for one when examining predictors of the other. Moderate to high associations between maternal depressive symptoms and parenting dimension and child symptoms may reflect mood biased reports, hence the need to control for maternal depression in multivariable analyses.

Table 2

Spearman's correlations between parenting dimensions and study outcomes and descriptive statistics.

	CU traits	ODD	Positive Parenting	Corporal Punishment	Parental Inconsistency	Maternal mood
ODD	.35**					
Positive Parenting	-.45**	-.28**				
Corporal Punishment	.17*	.31**	-.14			
Parental Inconsistency	.27**	.42**	-.13**	.30**		
Maternal mood	.37**	.30**	-.34**	.24**	.37**	
Mean	*16.01*	*4.43*	*44.86*	*5.26*	*16*	*6.81*
Standard deviation	*8.71*	*2.68*	*4.61*	*1.73*	*3.86*	*4.44*

** p < .001; * p < .05

3.4.4. Multivariate analysis

A summary of the hierarchical multiple linear regression models of the associations between parenting dimensions and CU traits is shown in Table 3. Child male gender, living in the Caribbean Region, maternal depressive symptoms and child ODD behaviours were each associated with higher CU traits in the initial model and had continued effects following Blocks 2 and 3. Low SES was not associated with CU traits scores. There was a clear contrast between corporal punishment and inconsistent parenting, which made no contributions to the model in Block 2, and positive parenting, which was associated with lower CU traits (β= -.33), when entered in Block 3 explained an additional 10% of variance in child CU traits.

Table 3

Summary of hierarchical multiple linear regression models predicting CU traits from parenting practices.

Block 1	Δ R^2	P Value	Variable	β	P Value
	.24	<.001	Gender (male)	.16	.005
			Low SES	.10	.105
			Pacific Region	.01	.963
			Caribbean Region	.14	.026
			Maternal mood	.28	<.001
			ODD behaviours	.25	<.001
Block 2	Δ R^2	P Value	Variable	β	P Value
	.01	.368	Gender (male)	.17	.005
			Low SES	.10	.093

			Pacific Region	.01	.941
			Caribbean Region	.15	.024
			Maternal mood	.30	<.001
			ODD behaviours	.28	<.001
			Parental Inconsistency	-.09	.167
			Corporal Punishment	.01	.990
Block 3	Δ R^2	P Value	Variable	β	P Value
	.10	<.001	Gender (male)	.13	.019
			Low SES	.02	.414
			Pacific Region	-.01	.779
			Caribbean Region	.14	.018
			Maternal mood	.22	<.001
			ODD behaviours	.22	<.001
			Parental Inconsistency	-.08	.189
			Corporal Punishment	.01	.907
			Positive Parenting	-.33	<.001

A summary of the regression models results for ODD behaviours are presented in Table 4. Gender and region did not predict ODD behaviours, but CU traits and maternal depressive symptoms did. In contrast to the models for CU traits, parental involvement and positive reinforcement were not associated ODD behaviours. However, inconsistent discipline and corporal punishment were both associated with higher ODD behaviours (β= .25 and β= .13, respectively) and explained an additional 8% of the variance.

Table 4

Summary of hierarchical multiple linear regression models predicting ODD behaviours from parenting practices.

Block 1	Δ R^2	P Value	Variable	β	P Value
	.17	<.001	Gender (male)	.08	.190
			Low SES	.05	.464
			Pacific Region	.12	.078
			Caribbean Region	-.11	.095
			Maternal mood	.17	.009
			CU traits	.28	<.001
Block 2	Δ R^2	P Value	Variable	β	P Value
	.01	.904	Gender (male)	.08	.194
			Low SES	.03	.479
			Pacific Region	.13	.081
			Caribbean Region	-.10	.097
			Maternal mood	.23	.010
			CU traits	.25	<.001
			Positive Parenting	-.01	.904
Block 3	Δ R^2	P Value	Variable	β	P Value

.08	<.001	Gender (male)	.05	.378
		Low SES	.01	.872
		Pacific Region	.06	.339
		Caribbean Region	-.13	.044
		Maternal mood	.06	.367
		CU traits	.27	.001
		Positive Parenting	-.01	.877
		Parental Inconsistency	.25	<.001
		Corporal Punishment	.13	.049

3.5. Discussion

In this cross-sectional study of 3.5-year-old children in Colombia we confirmed the factor structure of the APQ and ICU demonstrated in HICs. For the APQ, a three-factor solution with one positive parenting and two negative parenting dimensions fitted best. After testing ten possibilities based on the available literature for the ICU, a two-correlated factor solution fitted best. We then tested hypotheses based on HIC regarding specificity of parenting dimensions to child CU traits and found that associations between parenting dimensions and child behaviours showed high specificity. Positive parenting but not inconsistent parenting or corporal punishment, was associated with child CU traits. While ODD behaviours were moderately associated with CU traits, these associations were not diminished after controlling for ODD behaviours. Similarly, each of inconsistent parenting and corporal punishment but not positive parenting, were associated with ODD behaviours, and these associations were not diminished after controlling for CU traits. All the analyses controlled for geographical region, socioeconomic status, maternal educational level, and for maternal depression as a possible source of reporter bias.

In this sample of Colombian preschool children, we replicated the factor structure of the parent-report ICU proposed by Hawes et al. (2014) and found to be the best fitting factor structure in a sample of preschool children by Kimonis et al. (2016), both US studies. A recent investigation of the ICU in school-age children in China, accepted an 11-item version which excluded the one item drawn from the unemotional subscale (Wang et al., 2019) and this was then replicated in UK schoolchildren using self-report (Allen et al., 2020). In the present sample, the 11- and 12-item solutions showed very similar fit and we chose to retain the 12-item solution for four reasons: first, to retain comparability to the prior study using the ICU with preschool children (Kimonis et al., 2016); second, the item showed a moderate to good factor loading in this sample; third, the item “Does not show emotions” is from the original CU traits scale, the APSD, and has been included in the specifier for limited prosocial emotions for DSM-

V conduct disorder diagnosis: and fourth, the unemotional scale was proposed to have limited relevance in Chinese culture due to less encouragement of emotional expression which is not true of Latin American culture.

In this Colombian preschool sample, one item "Does not care if he/she is in trouble" showed a low factor loading (.26), which has not been seen in other uses of the 12- or 11-item solution, or in the three-correlated structure accepted by Ezpeleta et al. (2013) with 3-year-olds. The study by Kimonis et al. (2016) did not report their factor loadings to compare, so it is not clear whether this is a cultural or age-related difference. This low loading did contribute to the low Cronbach's alpha for the callous dimension (.63). However, overall, the 12-item total showed acceptable internal reliability. Interestingly, one item showed a very high factor loading in the present sample ("The feelings of others are unimportant to me") and this was the one item which showed a significantly higher factor loading in China compared to the UK in a cross-cultural measurement invariance analysis (Allen et al., 2020). Allen et al. speculated that this item may contribute more strongly to Callous traits in cultures which are characterized by a more collectivist orientation.

In line with the recommendations of Ray et al. we conducted the primary analysis with the total ICU score, and consistent with Kimonis et al. (2016) the results from using the 12-item and 24-item scale were very similar. This study provides the first evidence that the ICU shows acceptable psychometric properties in a preschool aged LMIC sample and adds to a growing number of studies suggesting that the bi-factor structure of the ICU is not supported in pre- and school-age children (e.g., Allen et al., 2020; Hawes et al., 2014; Houghton et al., 2013; Willoughby et al., 2015) and that shorter versions of the scale show improved psychometric properties and comparable validity.

We also found support for a three-factor structure of the APQ similar to studies of preschool children in HIC settings (de la Osa et al., Clerkin et al.,), providing support for the generalizability of the scale across high- and low-income settings. Clerkin et al. chose to subject

the entire APQ scale (including the 'other discipline' items not intended to contribute to the subscales) to EFA, which resulted in an expanded 'punitive practices' subscale comprising an item that is not clearly punishment ("you ignore your child when misbehaving"). In this study, similar to the Cova et al. study of Latin American children, we were able to support the original 3-item corporal punishment scale found from school-age and often clinical samples. Many recent studies in HICs have failed to support the 3-item corporal punishment scale. The finding in this study could reflect the greater cultural normativness of physical punishment in Colombia. Although, as in other studies, this scale shows low internal consistency, likely due to the small number of items, we prefer to use the scale as it was intended and clearly reflecting physical punishment.

This was the first study to examine specificity of both positive and negative parenting practices to both CU traits and ODD in an exclusively preschool sample of males and females. The findings add support to the proposal that positive aspects of parenting, particularly those likely to enhance parent-child interactions and to reinforce prosocial behaviour, may be particularly relevant to CU traits (Clark & Frick, 2016; Hawes et al., 2011; Waller & Hyde, 2017). The results also are consistent with previous findings concerning the role of negative parenting with oppositional and emotionally reactive behaviours probably via hostile discordant parent-child interactions (Granero, Louwaars, & Ezpeleta, 2015).

The results can be interpreted as indicating specificity of associations without providing evidence regarding directions of influence. Prospective studies suggest reciprocal influences between child behaviours and parenting (Burke, Pardini, & Loeber, 2008; Waller et al., 2014) and these are likely to explain at least in part the associations reported here. If evocative interactions are operating, the question is posed as to how higher CU traits, but not ODD behaviours lead to lower positive parenting, and how only ODD behaviours lead to increased negative parenting. Similar considerations apply to confounding by gene-environment correlations (Henry, Pingault, Boivin, Rijsdijk, & Viding, 2016; Henry et al., 2018).

3.5.1. Strengths and limitations

Strengths of the present study include testing the specificity of positive parenting for CU traits, and of negative parenting for ODD behaviours. Participants were recruited across three contrasting regions, and a widely available medium was used for recruitment, yielding a sample that in many aspects was representative of the general population of Colombia. The rate of low socioeconomic status (45%; SES) was like those in published studies (Buitrago-Lopez et al., 2015), and the numbers from rural districts (15%) were similar to national statistics (15.8%; DANE, 2018). The prevalence of self-reported Indigenous or Afro-Colombian status (14%) was very close to the national estimate of 14.4% (DANE, 2018). A third of the sample reported experiencing community violence or displacement. The sample differed, however, in that 50% of mothers and 48% of fathers had a university degree, contrasted with 22% in the general population (Organisation for Economic Co-operation and Development - OECD, 2018). Thus, although we contacted parents through social media almost universally accessed by the general population, participation was probably biased towards more highly educated parents, limiting the generalizability of the findings.

A further limitation was that both predictors and outcomes were assessed using maternal report. This may have led to associations inflated by common method variance but is unlikely to account for the specificity that we report. We sought to reduce risk of biasing by maternal mood by controlling for maternal depressive behaviours in the regression analyses. As discussed earlier, the cross-sectional design limits the interpretation of the direction of effects. Finally, consistent with other studies we found a low Cronbach's Alpha for both the APQ corporal punishment and inconsistent discipline scales (Essau et al., 2006; Cova et al., 2017; Healey et al., 2011), which likely in part reflects the small number of items on the scales (Tavakol & Dennick, 2011). Despite the low internal consistency, we included the scales in our analyses given the importance of indexing negative parental discipline in relation to CU traits and CPs in early adolescence (Viding, Fontaine, Oliver, & Plomin, 2009; Wootton, Frick, Shelton, & Silverthorn,

1997).

3.5.2. Conclusion

Against a background of the overwhelming predominance of studies into CU traits from HICs, studies from LMICs are needed both to test the generalizability of the construct and the measures, and to broaden the empirical study of possible mechanisms. Characterisation by the World Bank economic criteria for income does not account for the many important cultural variations across and within countries, so findings from one LMIC does not guarantee generalizability to other LMICs. Nevertheless, our findings are consistent with generalizability from HICs. In relation to the psychometric properties of the APQ and the ICU, it was striking how the questions posed when examining the factor structures and the limitations of specific items in this Colombian sample resembled those raised in studies from HIC settings.

The outcome of this process, favouring three factors in the APQ and one in the ICU, was entirely consistent with findings from HICs. The implication of the test of the specificity of associations between parenting dimensions and CU traits and ODD behaviours was different in that this has not previously been examined in a sample exclusively of preschool children, so we were not testing whether an HIC finding generalized to an LMIC. Rather we examined whether a hypothesis based on HIC studies generated predictions that were supported by findings from an LMIC study. That this was indeed the case argues for the generalizability of the hypothesized mechanism.

This present findings of a specific association between positive parenting and child CU traits, is consistent with a growing literature indicating reduced social engagement in child CU traits (Bedford et al., 2015; Bedford et al., 2017; Dadds et al., 2014) with the implication that enhanced positive parent-child engagement may reduce child CU traits. The pattern of findings is also consistent with neurobiological and behavioural evidence demonstrating diminished response to punishment in individuals with CU and psychopathic traits (Blair, 2013; Frick &

White, 2008; Reidy et al., 2017). Instead, individuals with CU traits possess a reward-dominant processing style, which suggests that they may be particularly responsive to parenting focused on reward-dominant reinforcement of prosocial behaviours (Reidy et al., 2017). In contrast, after accounting for CU traits, positive parenting showed no association with ODD behaviours, whereas both aspects of negative parenting showed unique associations. Collectively, the evidence supports a focus on enhancing positive parenting in intervention to reduce CU traits in the preschool period, a crucial time for intervention to curtail the start of persistent trajectories of antisocial behaviour. Future prospective studies, and particularly those within an intervention framework to allow specific mechanisms of change to be tested, are required over the toddler to preschool age range. The findings will support the development of targeted intervention and identify the optimal developmental periods for implementation.

3.6. References

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Chapter 4: Synergy between callous-unemotional traits and aggression in preschool children: cross-informant and cross-cultural replication in the UK Wirral Child Health and Development Study, and the Colombian La Sabana Parent-Child Study

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4.1. Abstract

Incremental prediction of aggression from Callous-unemotional (CU) traits is well established, but cross-cultural replication and studies of young children are needed. Little is understood about the contribution of CU traits in children who are already aggressive. We addressed these issues in prospective studies in the UK and Colombia. In a UK epidemiological cohort, CU traits and aggression were assessed at age 3.5 years, and aggression at 5.0 years by mothers (N= 687) and partners (N= 397). In a Colombian general population sample, CU traits were assessed at age 3.5 and aggression at 3.5 and 5.0 by mother report (N= 220). Analyses consistently showed prediction of age 5.0 aggression by aged 3.5 years CU traits controlling for age 3.5 years aggression. Associations between 3.5 years CU traits and 5.0 years aggression were moderated by aggression at 3.5 years, with UK interaction terms, same informant, β=.07 p=.014 cross-informant, β=.14 p=.002 and in Colombia, β=.09 p=.128. The interactions arose from stronger associations between CU traits and later aggression in those already aggressive. Our findings with pre-schoolers replicated across culturally diverse settings imply a major role for CU traits in the maintenance and amplification of already established aggression and cast doubt on their contribution to its origins.

Keywords: Callous-unemotional traits, aggression, preschool, cross-cultural, cross-informant.

Abbreviations: WCHADS = Wirral Child Health and Development Study

4.2. Introduction

Children with aggressive and disruptive behaviour 'conduct' problems (CPs) who also show lack of remorse, absence of empathy with others, uncaring attitudes, and lack of concern about the consequences of one's own performance, 'Callous-Unemotional' (CU) traits, differ in many respects from other children with CPs (Frick, Ray, Thornton, & Kahn, 2014; Frick & White, 2008). For example, the genetic contribution to their disorder is stronger (Henry, Pingault, Boivin, Rijsdijk, & Viding, 2016; Viding, Blair, Moffitt, & Plomin, 2005), and they are less sensitive to punitive parenting (Dadds & Salmon, 2003). Most studies of CU traits have been of children and adolescents. Furthermore, with few exceptions, studies of CU traits have been conducted in countries characterised by the World Bank as High-Income Countries (HICs), and it is yet to be established whether the findings generalise across cultures and socioeconomic conditions. Hypotheses regarding the mechanisms whereby CU traits create vulnerability for aggression envisage both that they may have a role in the emergence of aggression, or in perpetuating it in children who are already aggressive. In this study we examined in preschool children, the incremental validity of two measures of CU traits widely used in older children, and across contrasting cultures. We also tested the hypothesis that CU traits are associated with increasing child aggression specifically among children who are already aggressive using cross-cultural and cross-informant tests of robustness.

Given that 'life course persistent' CPs, which are associated with a wide range of adverse outcomes in adolescence and adulthood, typically start during the preschool period (Odgers et al., 2008), it is important to understand the role of CU traits in early onset CPs. This requires valid measurement of CU traits in young children. Several studies have provided support for validity in 3-year-olds based on incremental prediction of CPs over time after accounting for baseline CPs (Waller, Hyde, Grabell, Alves, & Olson, 2015; Waller et al., 2016; Waller, Hyde, Baskin-Sommers & Olson, 2017, but see Willoughby Mills-Koonce, Gottfredson, & Wagner, 2014). However, evidence regarding measures widely used in older children, is

limited. Furthermore, most studies of childhood CPs come from High Income Countries (HICs) such as USA, the Netherlands, Australia, Cyprus, UK, and Canada. Replication across HIC and Low- and Middle-Income Countries (LMICs) would add to the generalisability of findings. A search conducted for this paper using the term 'Callous-Unemotional traits' yielded 720 publications of which 15 were from LMIC settings (11 from China) 2% of the total. We were not able to identify any previous publications that compared effect sizes for the same analyses across HIC and LMIC countries. In this study, we sought to establish incremental prediction as a test of validity of two measures widely used in older children, the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) and the Inventory of Callous Unemotional Traits (ICU; Frick, 2004) in a HIC and in a LMIC.

Commonly in studies of young children, where teacher reports are not available, measurement relies on parent report, leading to the possibility of associations inflated by common method variance where the same parent reports on the key variables. Therefore, in a further test of robustness of our findings, we examined in the UK study incremental prediction by maternal report of CU traits to paternal report of child aggression.

Deficits in recognition of, and responsiveness to fear and sadness, possibly related to lack of eye contact in social interactions, are thought to underpin indifference to others' distress in CU traits (Blair, Colledge, Murray, & Mitchell, 2001; Dadds, Jambrak, Pasalich, Hawes, & Brennan, 2011). This deficient response to distress has been proposed to lead to persistent aggressive behaviour because the normal inhibitory effect of another persons' distress when harming them is reduced or absent (Blair, 2013; Blair et al., 2001). However, when we study CU traits in general population samples, in contrast to clinical samples where all the children have CPs, there are some indications that elevated CU traits may occur in the absence of CPs (Fanti, 2013; Fontaine, McRory, Boivein, Moffit, & Viding, 2011; Rowe et al., 2010; Wall, Frick, Fanti, Kimonis, & Lordos, 2016).

Our understanding of the processes that lead some children with high CU traits to develop aggressive and antisocial behaviours, while others do not, is limited. One possibility is that the risk for aggression arises from the combination of unresponsiveness to others' distress seen in CU traits and a second source of vulnerability such as under-arousal reflected in low cortisol reactivity (Wright, Hill, Pickles, & Sharp, 2019), low observed behavioural inhibition (Waller et al., 2017), parent reported need for stimulation and grandiose traits (Colins et al., 2014) or low mentalisation (Taubner, White, Zimmerman, Fonagy, & Nolte, 2013). These direct tests of synergy conducted using moderator analyses, are consistent with findings from studies using latent-profile analyses which have shown that children with elevated CU traits in the absence of CPs have lower levels of possible sources of additional individual and environmental vulnerabilities than those with both elevated CU traits and CPs (Fanti, 2013; Wall et al., 2016). A further and as yet relatively unexplored possibility, is that CU traits create vulnerability for CPs or aggression specifically among children who are already aggressive, for example by reducing their response to, or concern for, the harm they cause to others, which in turn decreases their likelihood of desisting their aggressive behaviour. If that were the case, we would expect the association between CU traits and future aggression to be greatest in the presence of current aggression. If CU traits only contribute to aggression among children who are already aggressive then we expect no association between CU traits and future aggression among non-aggressive children.

There has been limited attention paid to these possible mechanisms in preschool children, a key period for early intervention and the starting point of life-course persistent antisocial behaviour. In a one-year prospective study of one group of children recruited at ages 4-6 years, and another at ages 7-9 years, synergistic effects of baseline CU traits and CPs were seen in boys in the younger group, and in girls in the older group (Dadds, Fraser, Frost, & Hawes, 2005). These findings indicate that there may be age related differences in these processes, highlighting the need for studies that examine the mechanisms at specific ages, and test for replicability of

findings. In the studies reported here of preschool children we were able to ask whether there is a synergistic effect of CU traits and aggression that is seen in preschool children, in two contrasting cultural and socio-economic settings, and in same and cross-informant analyses.

4.3. Methods

4.3.1. Overview of method

Sampling, measures, and data analyses in Study 1 from the UK *Wirral Child Health and Development Stud*y (WCHADS) are described first, followed by sampling, measures, and analyses in Study 2 from the Colombian *La Sabana Parent-Child Study*. We then compare the effects from each study in Table 3 and Figure 1, showing associations between age 3.5 CU traits and age 5 aggression at three levels of initial aggression, and use a combined dataset to test whether the effects in the UK and Colombian studies are different.

4.4. Study 1

4.4.1. Participants and Procedure

The WCHADS is a prospective epidemiological study starting in pregnancy designed to identify the earliest origins of childhood CPs. [Further information about the data and conditions for access are available at the University of Liverpool Research Data Catalogue: https://doi.org/10.17638/datacat.liverpool.ac.uk/564]. Ethical approval was granted by the Cheshire North and West Research Ethics committee and all women gave written informed consent at the point of recruitment in the antenatal clinic.

The cohort comprised 1233 first-time expectant mothers recruited in pregnancy with a live, singleton baby for long-term follow-up post-birth (see Sharp et al. 2012 for detailed account of sampling). The participants were identified from consecutive first-time mothers who booked for antenatal care at 12-week gestation between 12/02/2007 and 29/10/2008. The booking clinic was administered by the Wirral University Teaching Hospital, which was the sole provider of universal prenatal care on the Wirral Peninsula. Socioeconomic conditions on the Wirral range between the deprived inner city and affluent suburbs but with low numbers from ethnic minorities. The mean age at recruitment was 26.8 years (SD= 5.8, range 18-51), 41.8% of the sample were in the most deprived quintile of UK neighbourhoods (Noble et al., 2004) and 96.1% were White British. The analysis that follows focuses on 687 children (326 boys) who provided questionnaire data by maternal report at both the age 3.5 years (mean age= 41.70 months, *SD*= 2.33) and 5.0 years (mean age= 58.18 months, SD= 2.83) waves, and on the 397 on whom partner reports were available at 5.0 years. The maternal report sample did not differ from the whole cohort (N= 1233) on maternal depression scores at 20 weeks ($t(1208)= 1.157$, p= .247) but was less deprived ($\chi 2$ (1, 1233)= 19.502, p<.001) and had a lower maternal age at pregnancy ($t(1230)= -1.834$, p<.001). The paternal report sample was less deprived ($\chi 2$ (1, 1233)= 9.690, p<.001), had a lower maternal age ($t(1230)= -6.697$, p<.001) and lower depression scores

(t(1208)= 2.217, p= .027) in pregnancy compared to the sample with mother report. Of the 687, the majority (80%) were two parent families and 32% of mothers had university degrees.

4.4.2. Measures

Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2000). The parent report CBCL for children aged 1.5 to 5 years was used to assess aggressive behaviours at age 3.5 and 5.0 years. It has 99 items to assess internalising and externalising behaviours in the past 6 months, rated on a 3-point scale (0= not true, 1= somewhat true/sometimes true, and 2= very true/often true). The sum of the 19 aggressive behaviour items was used in the analyses. In addition to maternal reports at age 3.5 and 5.0 years, we collected reports from biological fathers or mothers' current partner who had regular contact with the child at age 5.0. These are referred to as partner reports.

Antisocial Processes Screening Device (APSD; Frick & Hare, 2001). The parent-report CU subscale was used to assess CU traits. This measure has been widely used in studies of CU traits in childhood, including a sample of children aged 3 years (Kimonis et al., 2006). The six items are rated on a 3-point scale (0= not at all true, 1= sometimes true, and 2= definitely true). Internal consistency in this sample was α=. 60, similar to that reported by Kimonis et al. (α= .54). In previous reports we have generated a factor score with more satisfactory psychometric properties by adding items from the CBCL aggression scale (Wright, Hill, Sharp, & Pickles, 2018; Wright, Sharp, Pickles, & Hill, 2017) but we did not use this here to avoid item overlap with our outcome measure across the UK and Colombian studies, CBCL aggression.

Confounders. Potential sources of mood-biased reporting at age 5 years were accounted for in mothers using the 20-item Centre for Epidemiological Studies - Depression (CES-D; Radloff, 1977) and in partners with the 12-item General Health Questionnaire (Goldberg & Williams, 1988). Two indices of family demographic status were included as covariates: a) socioeconomic status, which was derived from post code data using the English Index of Multiple Deprivation (IMD; Noble et al., 2004) and converted to quintile categories with a

binary variable (1= most deprived, 0= all 4 other quintiles) used for analysis, and b) mother's age at pregnancy. Child sex (0= female, 1= male) was also included a covariate.

4.4.3. Data analyses

SPSS v.24 was used for the statistical analyses. Following square root transformations for skewed variables, bivariate associations between the study variables were examined using Pearson, point-biserial and tetrachoric correlations. In validity-checking and hypothesis-testing analyses, regression models predicting age 5.0 aggression were examined in three blocks. Block 1 included demographic covariates, age 3.5 years child aggression, and parental mood at age 5 years, Block 2 included age 3.5 years CU traits, and Block 3 included the age 3.5 years aggression by CU traits interaction; testing at each stage whether the addition of a block significantly increased the explained variance. The age 3.5 years CU traits by aggression interactions were then explored in each sample, firstly by using online computational tools to calculate regions of significance (Roisman et al., 2012), and secondly by using the margins command in Stata version 14 to test the association between age 3.5 CU traits and age 5.0 aggression at three levels of initial aggression: 1 SD above the mean, mean, and 1 SD below the mean.

4.4.4. Results

Bivariate associations between the transformed study variables and descriptive statistics for untransformed variables are presented in Table A1 (Appendix). Table 1 shows separate models for maternal report of CBCL aggression regressed on to Block 1 variables, then Block 2 after accounting for Block 1, and similarly Block 3 accounting for Block 1 and 2 variables, so that all the reported coefficients are directly interpretable. It can be seen that CU traits at age 3.5 years explained significant additional variance after accounting for contemporary aggression and after controlling for possible biasing effects of maternal mood on child report at age 5.0 years. There was also an age 3.5-years CU traits by aggression interaction, which arose as predicted by

a progressively stronger association between age 3.5 years CU traits and age 5.0 aggression, with increasing aggression at age 3.5 years, as shown in Table 3 and Figure 1.

Very similar effects were seen when father reported CBCL aggression at age 5.0 years was regressed on to mother reported age 3.5 years CU traits and aggression (Table 1 and 3, Figure 1). The regions of significance analysis indicated that the association between age 3.5 years CU traits and age 5.0 years aggression became significant at .67 SD's below the mean for mother reported outcome (equating to a score of 3 and above on age 3.5 aggression, N=524/687 children) and .13 SD's below the mean for partner reported outcome (equating to a score of 6 and above on age 3.5 aggression, N= 384/687).

Table 1

Summary of hierarchical multiple linear regression models predicting maternal and parental report of aggression in the WCHADS

	Maternal Report Age 5.0 Aggression					Partner Report Age 5.0 Aggression				
Variable	ΔR^2	p	β	95% CI	p	ΔR^2	p	β	95% CI	p
Block 1	.501	<.001				.270	<.001			
Child sex			.03	(-.04, .17)	.223			-.06	(-.36, .08)	.198
Mother age			.03	(-.01, .02)	.285			.01	(-.02, .02)	.875
Deprivation			.09	(.07, .30)	.002			.17	(.21, .69)	<.001
Maternal mood 5.0			.08	(.03, .13)	.004			.07	(-.03, .42)	.092
Aggression age 3.5			.67	(.62, .73)	<.001			.46	(.38, .55)	<.001
Block 2	.011	<.001	.12			.012	.010			
CU traits age 3.5				(.06, .18)	<.001			.12	(.12, .87)	.010
Block 3	.004	.014	.07			.018	.002			
Aggression X CU traits 3.5				(.01, .11)	.014			.14	(.15, .61)	.002

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

4.5. Study 2

4.5.1. Participants and Procedure

The *La Sabana Parent-Child Study* participants were recruited through Facebook groups likely to be used by young mothers, such as 'Latin Women League' and 'More Moms Colombia'. It is estimated that 91% of those between ages 14 and 65 in Colombia access Facebook (Ministerio de Tecnologías de la Información y las Comunicaciones, 2018). Parents who responded to the online study information (N= 344) were contacted to discuss participation. Of these, 40 were excluded as the children did not meet the age inclusion criteria of age 3-4 years. Of the remaining 304, 235 (77.3%) provided informed consent to take part in the study and full data. For the baseline assessment, 235 families with children of 3.5 years (M= 3.31, SD= .48) participated, 48% girls, and the mothers' average age was 30.04 years (SD= 6.29). The aim of recruitment was to establish a sample of children with mean age 3 years 6 months, and to achieve this, eligibility age criteria in the range 2 years 10 months to 4 years 2 months were used. The study was approved by the Research and Ethical Committee of the Psychology Department at La Sabana University.

Participants were recruited from three Colombian regions, each with different cultural, social, and demographic features. The Pacific (n= 69) and Caribbean (n= 70) regions are characterized by high levels of poverty and extensive numbers of Afro-Colombian and Indigenous inhabitants, while the Central region (n= 96) has the lowest levels of poverty in the country and it is predominantly *mestizo* (mix of European and Indigenous) (Ministerio de Ambiente y Desarrollo Sostenible, 2013). Overall, 15% of the participants lived in rural areas. The majority (77%) were two parent families and 50% of mothers and 48% of fathers had university degrees; 45% of the sample belonged to the lowest two household income classifications, based on the Colombian government system that classifies households into six categories (1 the lowest) determined by housing conditions and basic public services, such as sewerage and water supply (Departamento Administrativo Nacional de Estadística - DANE,

2011). Classifications 1 and 2 receive subsidies from the Colombian government. Asked to identify their ethnicity, 38% mothers identified as mestizo, 9% Afro-Colombian, 5% Indigenous, 13% from 'other' ethnic groups, and 35% did not identify themselves as belonging to a specific ethnic group. At follow-up, 18 months later, 220 (93%) participants provided data for the analyses presented here (mean age= 4.86; SD= .42; 51% girls).

4.5.2. Measures

This study included parent report measures as it was conducted while observational measures were obtained in a second assessment for a prospective study.

Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2000). The Spanish version of the CBCL for children aged 1.5 to 5 years was used to assess aggressive behaviours. For the present study, this scale had an internal consistency of .85 for the baseline and .88 for the follow-up, values that are like those previously reported with Colombian children (α= .86; Hewitt, Vila, & Juárez, 2016).

Inventory of Callous–Unemotional Traits (ICU; Frick, 2004). CU traits were measured using the parent report version for preschool children. This inventory has 24 items scored using a 4-point scale (0= not at all true, 1= somewhat true, 3= very true, and 4= definitely true). Evidence for the reliability and validity of the ICU total score in preschool children has been provided from a cross-sectional study by Kimonis et al. (2016). The Spanish version of the inventory was shared by the authors, who also approved its use in the present study. The internal consistency of the total score was good in the current sample (α= .82). Previous studies with Latin-American (Rigatti et al., 2017) and Spanish children (Ezpeleta, de la Osa, Granero, Penelo, & Domènech, 2013) have used the ICU. We have previously supported the factor structure of the ICU in this sample (Obando, Wright, Pickles, & Hill, 2020). Similar to other studies of childhood, a two-correlated factor structure showed the best fit, but in line with the recommendations of Ray, Frick, Thornton, Steinberg, & Cauffman (2012) we conduct the main

analysis using the full 24-item ICU total score but report the results using the 12-item total in the Appendix.

Confounder. The Spanish version of the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsy, 1987) was used to assess maternal mood. The EPDS has 10 items scored on a 4-point scale. This measure is widely used during the prenatal and postnatal periods with parents of young children (Huntley, Wright, Pickles, Sharp, & Hill, 2017). Internal consistency of the EPDS was good in a previous study of Colombian women (α= .78; Campo-Arias, Ayola-Castillo, Peinado-Valencia, Amor-Parra, & Cogollo, 2007) and in this study (α= .83). Child sex, maternal age at pregnancy, household income (operationalised as a binary variable: 1= lowest two DANE family income classifications, 0= all other income classifications), and dummy variables for Caribbean and Pacific regions were included as covariates in regression analyses.

4.5.3. Data analyses

Data analyses in Study 2 were the same as in Study 1, with the additional confounder of dummy variables for Caribbean and Pacific regions to the variables of Block 1.

4.5.4. Results

The bivariate associations between the study variables and descriptive statistics are presented in Table A2 (Appendix). Mean levels of aggression were somewhat higher than in the UK sample (age 3.5 aggression mean= 11.83, SD = 6.35, compared to mean= 7.43, SD 5.83; age 3 aggression t(1059)=9.77) p<.001; age 5 aggression t(988) = 4.587, p<.00, in WCHADS study). Overall associations were very similar to those in the WCHADS, although in contrast to the UK sample, in the La Sabana study the association between male sex and aggression at age 5.0 years was non-significant.

Table 2 shows that, as in WCHADS, CU traits at age 3.5 years explained significant additional variance after accounting for aggression at age 3.5 years. The age 3.5 years CU traits by baseline aggression interaction effect was slightly larger than in WCHADS but in this smaller

sample it was non-significant. It arose as in WCHADS study from a progressively stronger association between age 3.5 years CU traits and age 5 years aggression, with increasing aggression at age 3.5 years (Table 3 and Figure 1). The results were very similar when using the 12-item ICU total (See Appendix Table A3 and A4). The regions of significance analysis indicated that the association between age 3.5 years CU traits and age 5.0 years aggression became significant at .37 SD's below the mean on age 3.5 years aggression (equating to a score of 9 and above on age 3.5 aggression, N= 149/235 children).

Table 2

Summary of hierarchical multiple linear regression models predicting mothers report aggression in the La Sabana Parent-Child Study.

	ΔR^2	p	Variable	β	95% CI	p
Block 1	.281	<.001	Child sex	.02	(-.20, .27)	.783
			Mother age	.03	(-.02, .03)	.673
			Household income	-.01	(-.26, .24)	.947
			Pacific region	-.10	(-.49, .07)	.143
			Caribbean region	-.06	(-.42, .15)	.339
			Maternal mood age 5.0	.21	(.08, .34)	.002
			Aggression age 3.5	.43	(.30, .56)	<.001
Block 2	.021	.014	CU traits age 3.5	.17	(.04, .30)	.014
Block 3	.008	.128	Aggression X CU traits 3.5	.09	(-.02, .19)	.128

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

Table 3

Standardised beta's showing the association between age 3.5 CU traits and age 5.0 aggression at three levels of age 3.5 aggression (at mean and 1 SD above and below mean) in the two samples.

Age 3.5 aggression	UK- WCHADS Mother report			UK – WCHADS Partner report			Colombia – La Sabana Study		
	β	95% CI	p	β	95% CI	p	β	95% CI	p
1 SD below mean	.05	-.03, .13	.202	-.01	-.12, .12	.947	.08	-.10, .25	.267
At mean	.11	.05, 17	<.001	.14	.02, .21	.022	.16	.02, .29	.006
1 SD above mean	.17	.10, .24	<.001	.28	.17, .38	<.001	.28	.08, .40	<.001

4.6. Comparison of main and interactive effects in the WCHADS and La Sabana studies

4.6.1. Data analyses

The data from the two cohorts with maternal report of age 5 years aggression were then standardised and pooled to test whether the main and interactive effects of CU traits differed between the UK and Colombia.

4.6.2. Results

Table 4 presents the results from the combined dataset. There was a significant main effect of age 3.5 years CU traits after accounting for age 3.5 years aggression, and a significant CU trait by aggression interaction. Neither of these effects was moderated by country. There was a two-way aggression by country interaction reflecting a stronger continuity between age 3.5 years and age 5.0 years aggression in the WCHADS sample. The results were very similar when using the 12-item ICU total in the Colombian study (See Appendix Table 5A).

Table 4

Summary of hierarchical multiple linear regression model predicting age 5.0 maternal report aggression from CU traits age 3.5 in the combined WCHADS and La Sabana dataset.

	ΔR^2	p	Variable	β	95% CI	p
Block 1	.448	<.001	Country	.02	(-.07, .17)	.393
			Aggression age 3	.62	(.57, .67)	<.001
Block 2	.013	<.001	CU traits age 3	.13	(.07, .18)	<.001
Block 3	.015	<.001	Aggression X CU traits 3.5	.07	(.02, .11)	.004
			Aggression X Country	.20	(.10, .36)	.001
			CU traits X Country	-.04	(-.17, .08)	.448
Block 4	.000	.693	Aggression X CU traits X Country	-.02	(-.12, .08)	.693

Note: the variables main effects and two-way interactions were taken from their individual blocks. Confounds not shown.

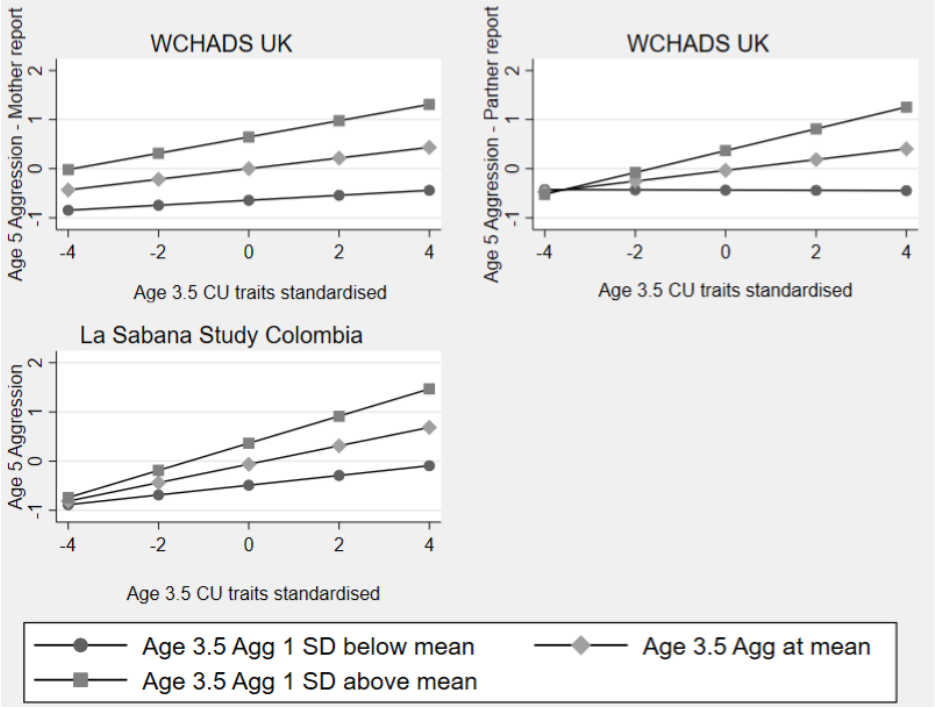

Figure 1. The prospective association between age 3.5 CU traits and age 5.0 aggression at three levels of age 3.5 aggression (at mean and 1 SD above and below mean) in the mother and partner report WCHADS sample and mother report La Sabana Parent-Child study.

4.7. Discussion

In two longitudinal general population samples of preschool aged children, we found support for the validity of two measures of CU traits widely used in older children at age 3.5 years. The robustness of this finding was supported by incremental prediction by CU traits at 3.5 years, accounting for concurrent aggression, of aggression at age 5.0 years across two cultures in the UK and in Colombia, and by cross-informant prospective associations in the UK. This provided the basis for testing the hypothesis that CU traits are associated with increasing child aggression specifically among children who are already aggressive. Using the same cross-cultural and cross-informant tests of robustness, we found that the association between CU traits and later aggression was much greater in children who were already aggressive at age 3.5 years than among those with lower levels of aggression. In all cases the association between CU traits and later aggression was not significant at one standard deviation below the mean on concurrently assessed aggression. This study represents the first cross-cultural comparison of effect sizes in testing both the validity of CU traits in relation to aggression and in exploring the synergistic relationship between CU traits and aggression predicting future aggression.

The findings add to the evidence that CU traits may act in synergy with other vulnerabilities, such as low arousal or behavioural inhibition (Waller et al., 2017; Wright et al., 2019), sensation-seeking and grandiose traits (Colins et al., 2014), or low mentalising ability (Taubner et al., 2013) to increase the risk for aggression in children. As we noted earlier, these direct tests of synergy are complemented by studies using latent-profile analyses to identify groups of children with common characteristics, which have revealed differences between high CU traits low CPs and high-CU traits high CPs groups indicative of further synergies. For example, in a study of Cypriot children aged 7-11 years, those with both elevated CU traits and CPs had poorer executive function and had experienced less positive parenting than those with elevated CU traits without CPs, consistent with the idea that CU traits confer risk for aggression only in the presence of additional vulnerability (Wall et al., 2016). While studies such as these

point to ways in which CU traits may contribute to CPs or aggression in synergy with other factors, they do not examine for their dynamic interplay in the same way as the moderation analyses presented here, or as studies using latent transition analyses (Haltigan & Vaillancourt 2018).

In relation to the synergy between CU traits and aggression, we can envisage mechanisms whereby CU traits either decrease the likelihood of reduction or increase the likelihood of escalation. The aggressive child with low CU traits may be expected to be concerned about the distress they cause in other children, leading them to alter their behaviours, while the child with elevated CU traits lacks this mechanism for desisting. If other children respond with aggression, as well as with distress, this may create conditions for escalation unrestrained by concern. We were not however able to demonstrate the counterfactual that CU traits do not predict later aggression in low aggression children. While the effects were much smaller and non-significant in low-aggression children across all three models, absence of effect could not be demonstrated given the sample sizes. It remains to be established therefore, whether early CU traits, or their precursors, play a role in the emergence of aggressive behaviours in young children. Another possibility, which we did not examine, is that CU traits in the absence of aggression predicts other adverse outcomes. Rowe et al. (2010) reported that children with high CU traits but without DSM Conduct Disorder had higher rates of peer difficulties and emotional problems than those with neither CU traits nor Conduct Disorder. It may also be the case that CU traits in the absence of overt aggressive behaviour may be predictive of later more covert forms of antisocial behaviour, such as relational aggression.

This study builds on our previous findings where we supported the factor structure of the ICU in this Colombian sample found in HIC samples (Obando et al., 2020), by providing evidence for the validity of the ICU in relation to aggression in a LMIC setting. The associations between CU traits and aggression, both cross-sectionally and prospectively, the incremental validity of CU traits predicting future aggression, and the interaction between CU traits and

aggression, were remarkedly similar across the Colombian and UK settings. When testing for differences in the effects, only the prospective association between aggression at age 3.5 years and 5.0 years was significantly different across countries, with the UK sample showing high continuity. As far as we are aware, this is the first study to provide a formal test of whether there are cross-cultural differences in the associations between CU traits and aggression.

The strengths of the study were that we examined associations prospectively in general population samples, testing for replication, and for common method variance explanations using cross-informant measurement. This was particularly important given the relative paucity of evidence in young children, and in the light of concerns regarding the validity and measurement of CU traits in 3–4-year-olds. Developmental processes in the origins of child CPs in general, and of the role of CU traits in particular, have not been studied extensively outside of HICs, so the inclusion of a demographically diverse cohort from Colombia was a distinctive strength. A limitation of the replication is that, although it was somewhat higher than the interaction in the UK sample, the age 3.5 years CU traits by aggression interaction in the smaller La Sabana study was non-significant. Both studies aimed to recruit samples that were representative of general populations, however, in the UK study attrition over the period from pregnancy to age 5 was selective, with more deprived families and younger mothers more likely to be lost from the study. Also, in the Colombian study, despite a similar proportion of families belonging to the lowest government family income classifications as reported from previous studies in Colombia (Buitrago-Lopez et al., 2015) around half of the sample had University degrees, contrasted with 22% in the general population (Organisation for Economic Co-operation and Development - OECD, 2018).

The modest internal consistency of APSD in the UK sample was a concern, raising the possibility that it may not have provided a good index of CU traits. This was mitigated to some degree by replication of validity and hypothesis-testing findings in the Colombian sample where the ICU showed good internal consistency in 3.5-year-olds. The APSD has been repeatedly

found to have a low Cronbach's Alpha, especially in studies with younger children (e.g., Dadds et al., 2005; Kimonis et al., 2006) and likely influenced by the small number of items on the scale (Tavakol & Dennick, 2011). The APSD was the only measure of CU traits available at the time of the age 3.5 years data collection wave in WCHADS, as the ICU had not been adapted or validated for use with pre-school children. We included parental mood at the time of reporting the outcome to attempt to address the risk of biasing by mood. Unfortunately, different measures were used in the two samples and for the mother and partner reporters. Finally, while we took steps to check the possible role of same-informant effects, the robustness of the findings would have been further enhanced through the use of observational measures, such as of child empathy, and additional informants for child behaviours.

The findings have implications for the study of the link between CU traits and child aggression. On the one hand, they could point to as yet unidentified heterogeneity whereby CU traits associated with later aggression are underpinned by different processes from CU traits with little or no implications for later aggression. Indeed, this may be an alternative explanation for the moderator effect we report. The presence of aggressive behaviours at baseline in our studies may be a marker for such heterogeneity, whereby for example the CU traits of those who already aggressive may be a manifestation of an unmeasured additional vulnerability, such as low arousal, which accounts for the stronger association with later aggression. Studying the dynamic interplay between CU traits and aggression over time could help clarify this further. By contrast, if there is synergy of the kind we have hypothesised, specific mechanisms could be examined, for example, experimental approaches that examine the moment-by-moment responses of high aggression-high CU traits children to others' distress resulting from peer aggression.

Furthermore, the role of different kinds of interpersonal sensitivity needs to be understood. The finding in adolescents of synergy between CU traits and low mentalisation suggests each may have distinct functions (Taubner et al., 2013), with further questions to be addressed regarding ways they may modify aggression. Regarding early intervention the findings

strongly suggest targeting high aggression-high CU traits children, and that interventions either to reduce CU traits or to reduce aggression in these children may be effective. Equally interventions may need to address specifically whether aggressive children with high CU traits can be provided with alternative strategies for understanding the emotional impact of their behaviours.

4.8. References

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4.9. Appendix

Table 1A

Bivariate associations and descriptive statistics for the WCHADS study; Transformed scores were used for Pearson's correlations with tetrachoric correlations for binary/binary associations and point-biserial for binary/continuous associations; raw scores were used for the descriptive statistics.

	Age 5 Aggr. mother report	Age 5 Aggr. partner report	Age 3 Aggr. mother report	Age 3 CU traits	Maternal mood	Partner mood	Mother age	Most deprived	Male sex
Age 5 aggression partner report	.64***								
Age 3 aggression mother report	.70***	.50***							
Age 3 CU traits	.38***	.37***	.38***						
Maternal mood	.24***	.13**	.25***	.15***					
Partner mood	.12*	.15**	.15**	.12*	.18***				
Mother age	-.11**	-.08	-.16***	-.20***	.11**	.01			
Most deprived	.13***	.19***	.06	.17***	.10**	.05	-.32***		
Male sex	.12**	.11*	.11**	.15***	.06	.01	.01		
Mean (SD)	6.64 (6.13)	5.81 (5.87)	7.43 (5.83)	3.26 (1.90)	7.66 (7.90)	9.59 (4.56)	28.00 (5.75)		
%								36	48

*p<.05 **p<.01 ***p<.001 Note. Maternal mood was assessed using the Centre for Epidemiological Studies Depression scale and partner mood using the General Health Questionnaire. Aggr.= Aggression

Table 2A

Bivariate associations and descriptive statistics for the La Sabana Parent-Child Study; Transformed scores were used for Pearson's correlations with tetrachoric correlations for binary/binary associations and point-biserial for binary/continuous associations; raw scores were used for the descriptive statistics.

	Mean (SD)	%	Age 5 aggression	Age 3 aggression	Age 3 CU traits	Maternal mood	Mother age	Most deprived	Male sex
Age 3 aggression	11.83 (6.35)		.49***						
Age 3 CU traits	16.01 (8.71)		.39***	.40***					
Maternal mood	6.17 (4.50)		.34***	.38***	.28***				
Mother age	30.00 (6.25)		-.13	-.24***	-.19*	-.30***			
Most deprived		45	.12	.12	.21**	.23***	-.25***		
Male sex		51	.09	.16*	.17**	-.03	-.03	.01	
Central region		41	.05	-.05	-.06	.08	.08	.03	-.01
Caribbean region		30	-.04	.10	.12	-.05	-.05	.09	.14
Pacific region		29	-.02	.15*	-.05	-.03	-.03	-.13	-.10

*p<.05 **p<.01 ***p<.001. Note. Maternal mood was assessed using the Edinburgh Postnatal.

Table 3A

Summary of hierarchical multiple linear regression models predicting age 5.0 aggression from age 3.5 12- item CU traits and aggression in the La Sabana Parent-Child Study.

	ΔR^2	p	Variable	β	95% CI	p
Block 1	.276	<.001	Child sex	.02	(-.20, .27)	.770
			Mother age	.03	(-.02, .03)	.684
			Household income	-.01	(-.26, .24)	.947
			Pacific region	-.10	(-.49, .08)	.151
			Caribbean region	-.06	(-.42, .15)	.343
			Maternal mood age 5.0	.21	(.07, .34)	.003
			Aggression age 3.5	.42	(.30, .60)	<.001
Block 2	.018	.022	CU traits age 3.5	.16	(.04, .30)	.022
Block 3	.009	.118	Aggression X CU traits 3.5	.10	(-.02, .21)	.118

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

Table 4A

Standardised beta's showing the association between age 3.5 CU traits and age 5.0 aggression at three levels of age 3.5 aggression (at mean and 1 SD above and below mean) in the two samples, using the 12-item ICU total in Colombia.

Age 3.5 aggression	UK - WCHADS Mother report			UK - WCHADS Partner report			Colombia - La Sabana Study 12-item ICU		
	β	95% CI	p	β	95% CI	p	β	95% CI	p
1 SD below mean	.05	-.03, .13	.202	-.01	-.12, .12	.947	.05	-.10, .20	.485
At mean	.11	.05, 17	<.001	.14	.02, .21	.022	.16	.05, .27	<.001
1 SD above mean	.17	.10, .24	<.001	.28	.17, .38	<.001	.26	.10, .24	<.001

Table 5A

Summary of hierarchical multiple linear regression models predicting age 5.0 maternal report aggression from age 3.5 maternal report CU traits (using the 12-item ICU in Colombia) and aggression in the combined WCHADS and La Sabana Studies.

	ΔR^2	p	Variable	β	95% CI	p
Block 1	.448	<.001	Country	-.07	(-.24, .09)	.385
			Aggression age 3	.63	(.58, .68)	<.001
Block 2	.013	<.001	CU traits age 3	.13	(.07, .18)	<.001
Block 3	.015	<.001	Aggression X CU traits 3.5	.07	(.02, .11)	.003
			Aggression X Country	.25	(.11, .38)	<.001
			CU traits X Country	-.04	(-.16, .09)	.569
Block 4	.000	.693	Aggression X CU traits X Country	-.04	(-.14, .07)	.504

Note: the variables main effects and two-way interactions were taken from their individual blocks. Confounds not shown.

Chapter 5: Is the moderating role of maternal praise and positivity in the association between CU traits and later aggression confined to children who are already aggressive? A prospective study in preschool children in Colombia.

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5.1. Abstract

The evidence as to whether positive parenting attenuates the association between CU traits and conduct problems, and therefore could play a protective role, has been inconsistent. In view of our previous finding, that CU traits predict later aggression specifically in children who are already aggressive, we asked whether positive parenting attenuates this association. The sample comprised 220 mothers of children (48% female) recruited at age 3.5 years through social media across three regions in Colombia. Mother-child interactions were coded for maternal positive reinforcement and positivity, and mothers reported on their children's CU traits (Inventory of Callous Unemotional Traits; ICU) and aggression (Child Behavior Checklist) at age 3.5 years, and aggression again at 5.0 years. In hierarchical multiple linear regression, there was a significant three-way interaction between maternal praise, CU traits and aggression ($p = .025$). Consistent with hypotheses, specifically in the presence of high aggression, high maternal praise was associated with a reduced association between CU traits and later aggression although this two-way interaction was not significant ($p = .097$). The three-way interaction between maternal positivity, CU traits and aggression was not significant ($p = .093$), but similar to maternal praise, maternal positivity had a protective effect among children already aggressive, and the two-way interaction was significant ($p = .045$). The findings provide evidence that positive parenting moderates the association between CU traits and later aggression in children who are already aggressive. This topic has great potential clinical relevance and future longitudinal studies with an intervention design are required.

Keywords: positive parenting; Callous-unemotional traits; aggression; conduct problems; children, preschool.

5.2. Introduction

The construct of Callous-unemotional (CU) traits has proved highly productive in the identification of important heterogeneity within conduct problems (CPs), and hence in understanding their origins, and maintenance, and ultimately in the identification of appropriate treatments for these serious and often persistent disorders (Frick, Ray, Thornton, & Kahn, 2014). CU traits may create vulnerability to CPs, and in particular aggression, by removing an internal source of restraint, empathy for others' distress. In that case, the effect of CU traits on later aggression may be attenuated in the presence of alternative sources of restraint. These may be internal, for example, higher levels of physiological arousal (Wright, Hill, Pickles, & Sharp, 2019) or increased mentalisation (Taubner, White, Zimmerman, Fonagy, & Nolte, 2013). Alternatively, external restraint in the presence of elevated CU traits may be provided by positive reinforcement for prosocial behaviours, or by warm supportive parenting which may promote the internalisation of social norms and prosocial behaviour (Kochanska, Aksan, & Joy, 2007; Kochanska, Kim, Boldt, & Yoon, 2013). We have previously shown that CU traits at age 3.5 are associated with aggression at age 5.0 years specifically among children who are already aggressive (Obando, Wright, Pickles, & Hill, 2020a). In this prospective study of 220 children and parents in Colombia, with observations of mother-child interactions at age 3.5 years and maternal report of child behaviours at ages 3.5 and 5.0 years, we asked whether this association is attenuated by high maternal praise and high positivity.

5.2.1. The role of positive parenting in relation to the link between CU traits and conduct problems

A substantial literature, including a number of studies with genetically informed designs supports a role for positive parenting in the development of CU traits (Henry et al., 2018; Hawes, Dadds, Frost, & Hasking, 2011; Waller, Hyde, Klump, & Burt, 2018). However, whilst theoretical considerations for the potential role of positive reinforcement and parental positivity in reducing CPs in children with CU traits (Kochanska et al., 2013; Reidy et al., 2017), the

available evidence is inconsistent. Generally, prospective studies have failed to demonstrate that positive parenting moderates the association between CU traits and CPs. For example, studying a sample of aggressive children aged 9-12 years over one year, Pardini, Lochman and Powell (2007) found that child reported parental warmth and involvement did not moderate associations between CU traits and later antisocial behaviour. Using a broad measure of observed positive parenting that included contingent use of praise, in a general population high-risk sample of 364 children at age 2-4 years, positive parenting did not moderate the association between CU traits and later behaviour problems (Hyde et al., 2013). By contrast, moderation was observed prospectively in a lower risk sample of 100 two parent families in which positive parenting was observed over multiple contexts at ages 38 and 52 months, CU traits and externalising behaviours were assessed at 67 months and externalising behaviours again at 80 and 100 months (Kochanska et al., 2013). Positive parenting reduced the prospective association between CU traits and later externalising behaviours. The positive parenting coded in this study was more dyadic than in other studies, reflecting shared positive affect and shared responsiveness between parent and child.

Several prospective studies have found cross-sectional moderation that was not evident at follow up. Kroneman, Hipwell, Loeber, Koot and Pardini (2011) found that low maternal warmth predicted faster decreasing levels of CPs among girls with high CU behaviour (N= 1233; aged 7-8 years old at baseline) but the interaction was no longer significant after five years. Moderation has also been shown in several solely cross-sectional studies. In a study by Pasalich, Dadds, Hawes and Brennan (2011) of clinic referred boys aged 4-12 years, parental warmth assessed in the Five-Minute Speech Sample (FMSS; Magaña et al., 1986) was associated with lower CPs, specifically in the presence of elevated CU traits. Using parent report in the Alabama Parenting Questionnaire (APQ; Frick, 1991), Clark and Frick (2016) showed in a cross-sectional study that in children aged 4 to 12 years positive reinforcement was associated with lower CPs specifically in the presence of high CU traits.

Studies using latent profile analysis can also provide pointers to the role of positive parenting. In a study of 1366 children aged 7-11 years at recruitment, CU traits were assessed using the Inventory of Callous-unemotional traits (ICU; Frick, 2004) and positive reinforcement and positive involvement were examined separately using child and mother report on the APQ (Wall, Frick, Fanti, Kimonis, & Lordos, 2016). In this study, latent profile analysis using data from the three time points yielded five groups, including a high-CU traits only group (9.4%) and a high-CPs and CU traits group (7.2%). Mothers of children in the high-CU traits only group reported higher levels of involvement and positive reinforcement than those of the high-CPs and CU traits group, consistent with a protective role for positive parenting.

CU traits have almost exclusively been investigated in High-Income Countries (HICs; World Bank, 2020). Evidence from Low and Middle-Income Countries (LMICs) has mainly been provided from China, where support for the reliability and validity of the CU traits construct in school-age and adolescent children has been provided (Wang et al., 2019; Zhang et al., 2019). In this sample of preschool Colombian children, we have reported on the reliability and factor structure of the main measure of CU traits in children, the Inventory of Callous-Unemotional traits (Obando et al., 2020a) and provided evidence of validity in relation to aggression (Obando et al., 2020b). We also provided evidence for specificity in cross-sectional associations between parent-report of positive parenting and child CU traits and negative parenting and child ODD symptoms but did not examine moderation. In a HIC outside of a Western setting, and with adolescents, Sng et al. (2018) examined moderation by negative parenting practices only and replicated findings from HIC. To our knowledge, no study in a LMIC has examined whether positive parenting moderates the association between CU traits and CPs.

Against the rather inconclusive available evidence, it might be predicted that positive parenting will not moderate the association between CU traits and later aggression. However, this may be because the association between CU traits and later aggression is confined to, or

substantially stronger in, children who are already aggressive (Obando et al., 2020b). In this study we therefore examined whether there is an effect of positive parenting in attenuating the association between CU traits and later aggression, specifically among children who are already aggressive. In this prospective study over 18 months we modelled the three-way interaction between maternal positive parenting, CU traits and child aggression at age 3.5 years in the prediction of aggression at age 5 years. Positive parenting was assessed as observed maternal praise for following instructions, and warmth and reciprocity during play.

5.3. Methods

5.3.1. Participants and Procedure

The *La Sabana Parent-Child Study* participants were recruited through Facebook groups likely to be used by young mothers, such as 'Latin Women League' and 'More Moms Colombia'. It is estimated that 91% of those between the ages of 14 and 65 in Colombia access Facebook (Ministerio de Tecnologías de la Información y las Comunicaciones, 2018). Parents who responded to the online study information (n= 344) were contacted to discuss participation. Of these, 40 were excluded as the children did not meet the age inclusion criteria of age 3-4 years. Of the remaining 304, 235 (77.3%) provided informed consent to take part in the study and full data. For the baseline assessment, 235 families with children of 3.5 years (M= 3.31, SD= .48) participated, 48% girls, and the mothers' average age was 30.04 years (SD= 6.29). At follow-up, 18 months later, 220 (93%) participants provided data for the analyses presented here (mean age= 4.86; SD= .42; 51% girls). The study was approved by the Research and Ethical Committee of the Psychology Department at La Sabana University.

Participants were recruited from three Colombian regions, each with different cultural and demographic features. The Pacific (n= 69) and Caribbean (n= 70) regions are characterized by high levels of poverty and extensive numbers of Afro-Colombian and Indigenous inhabitants, while the Central region (n= 96) has the lowest levels of poverty in the country and it is predominantly mestizo (mix of European and Indigenous) (Ministerio de Ambiente y Desarrollo Sostenible, 2013). Overall, 15% of the participants lived in rural areas. The majority (77%) were two parent families and 50% of mothers and 48% of fathers had university degrees; 45% of the sample belonged to the lowest two household income classifications, based on the Colombian government system that classifies households into six categories (1 the lowest) determined by housing conditions and basic public services, such as sewerage and water supply (Departamento Administrativo Nacional de Estadística - DANE, 2011). Classifications 1 and 2 receive subsidies from the Colombian government. Regarding participants ethnicity, 38% mothers identified as

mestizo, 9% Afro-Colombian, 5% Indigenous, 13% from 'other' ethnic groups, and 35% did not identify themselves as belonging to a specific ethnic group. The sample analysed here represents participants who provided questionnaire data at age 3.5 and 5.0 years and mother-child observational data at 3.5 years (N= 220).

5.3.2. Measures

Parental report of Callous-Unemotional Traits. CU traits were measured at 3.5 years and at 5.0 years using the parent-report preschool version of the Inventory of Callous–Unemotional Traits (ICU; Frick, 2004). This inventory has 24 items scored using a 4-point scale (0= not at all true, 1= somewhat true, 3= very true, and 4= definitely true). Evidence for the reliability and validity of the ICU total score in preschool children in a HIC setting has been provided from a cross-sectional study by Kimonis et al. (2016). In this Colombian sample, at age 3.5 and 5.0 years we have replicated the best-fitting factor structure reported in Kimonis et al. (2016), a 12-item two-correlated factor structure, and found similar internal reliability (Obando et al., 2020a) and provided evidence for validity in relation to aggression (Obando et al., 2020b). In line with the recommendations of Ray, Frick, Thornton, Steinberg and Cauffman (2016) we conduct the main analysis using the total 24-item ICU scale, but report the results using the 12-item total in the appendix. The internal consistency in this sample for the 12-item total is α= .71 at age 3.5, and α= .78 at age 5 years, and for the 24-item total it is α= .82 at age 3 years, and α= .85 at age 5 years. The Spanish version of the inventory was shared by the authors, who approved its use in the present study.

Parental report of Aggressive Behaviour: Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2000). The Spanish version of the CBCL for children aged 1.5 to 5 years was used to assess aggressive behaviours. For the present study, this scale had an internal consistency of .85 for the baseline and .88 for the follow-up, values that are like those previously reported with Colombian children (α= .86; Hewitt, Vila, & Juárez, 2016).

Observation of mother-child interactions. Video recordings were made of mothers and children in a standardized procedure used previously in National Institute for Child Health and Development studies (NICHD; Child Agency code from NICHD Early Child Care Research Network, 1999). Parents and children were provided with three bags of toys which they are asked to play with in a pre-set order over 15 minutes, and then a pre-agreed signal the child is asked to tidy up the toys. Mother-child play was rated using the Parent-Child Interaction System (PARCHISY; Deater-Deckard, 2000) generating a parental positivity score as the average of *positive affect* and *reciprocity* scales (Deater-Deckard, Li & Bell, 2016). Unlabelled praise during tidy-up was assessed using the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, Nelson, Duke, & Boggs, 2004). Research assistants in Colombia were trained by reliable UK coders, and high agreement between them on 30 independently rated recordings in English from the UK was achieved (all ICCs >= .78). There were too few instances of labelled praise in either UK or Colombian studies for reliability analyses.

Confounders. The Spanish version of the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsy, 1987) was used to assess maternal mood at age 5 to account for possible mood related biases in reporting. The EPDS has 10 items scored on a 4-point scale. This measure is widely used during the prenatal and postnatal periods with parents of young children (Huntley, Wright, Pickles, Sharp, & Hill, 2017). Internal consistency of the EPDS was good in a previous study of Colombian women (α= .78; Campo-Arias, Ayola-Castillo, Peinado-Valencia, Amor-Parra, & Cogollo, 2007) and in this study (α= .83). Child sex, household income (operationalised as a binary variable, 1= lowest two DANE family income classifications, 0= all other income classifications), and dummy variables for Caribbean and Pacific regions were included as covariates in regression analyses.

5.3.3. Data analyses

Stata version 16 was used for the statistical analyses. Following square root transformations for skewed variables, bivariate associations between the study variables were

examined using Pearson, point-biserial and tetrachoric correlations. Maternal praise was highly skewed and therefore a binary variable reflecting 0= no praise, and 1= 1 or more instances of praise was used for analysis. Maternal praise and positivity were examined in two separate regression models. The models were estimated in three blocks. Block 1 included demographic covariates and parental mood at age 5 years, Block 2 included age 3.5 years child aggression, age 3.5 years CU traits, and parenting, Block 3 included the two-way interactions terms, and Block 4 the three-way interaction between age 3.5 years aggression, CU traits and parenting, testing at each stage whether the addition of a block significantly increased the explained variance. Each block explores direct effects in block 1 and 2, and interactions in Blocks 3 and 4. The rationale of this is that we went from simple to complex models to identify which explained more percentage of the variance.The three-way interactions were then explored by examining the two-way interactions between CU traits and parenting at high and low levels of age 3.5 aggression, indexed using a median split.

5.4. Results

Bivariate associations between the transformed study variables and descriptive statistics for untransformed variables are presented in Table 1.

Table 1

Summary of hierarchical multiple linear regression models predicting age 5.0 aggression from maternal praise, CU traits and aggression.

	ΔR^2	p	Variable	β	p
Block 1	.13	<.001	Child sex	.11	.107
			Household income	-.4	.564
			Pacific region	-.01	.902
			Caribbean region	-.01	.949
			Maternal mood age 5.0	.35	<.001
Block 2	.18	<.001	Aggression age 3.5	.37	<.001
			CU traits age 3.5 years	.20	.004
			Maternal praise	.12	.047
Block 3	.01	.604	Aggression X CU traits 3.5	.06	.354
			Aggression X praise 3.5	-.05	.610
			CU traits X praise	-.04	.660
Block 4	.02	.025	Aggression X praise X CU traits	-.21	.025

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

Table 1 shows separate models for maternal report of CBCL aggression regressed on to Block 1 variables, then Block 2 after accounting for Block 1, Block 3 accounting for Block 1 and 2 and similarly Block 4 after accounting for Block 1, 2 and 3 variables, so that all the reported coefficients are directly interpretable. After accounting for sociodemographic confounders and maternal mood at time of reporting outcome in Block 2, age 3.5 years CU traits, aggression and, unexpectedly, maternal praise, all significantly predicted increased age 5.0 aggression. In Block 3, none of the two-way interaction terms was significant. However, in Block 4, the three-way interaction between CU traits, aggression and praise was significant (p= .025). In Table 2, we show the two-way interaction between CU traits and praise in groups below and above the median on age 3.5 years aggression.

Table 2

Summary of hierarchical multiple linear regression models predicting age 5.0 years aggression from age 3.5 years CU traits and maternal praise in high and low aggression groups.

	Low Aggression				High Aggression			
Variable	ΔR^2	p	β	p	ΔR^2	p	β	p
Block 2	.11	.046			.10	.002		
Maternal praise			.17	.089			-.01	.835
CU traits			.21	.035			.34	<.001
Block 3	.02	.110			.01	.302		
CU traits X maternal praise			.22	.111			-.19	.097

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2.

Whilst the two-way interaction in the high aggression group was not conventionally significant, it can be seen in the right panel of Figure 1 that the association between age 3.5 years CU traits and age 5.0 aggression was attenuated in the children with high praise. Unexpectedly, whilst the two-way interaction in the low aggression group was also non-significant, it can be seen in Figure 1 that the association between age 3.5 CU traits and later aggression was stronger in children with high maternal praise. However, when we repeated this analysis using the short 12-item ICU (shown in Appendix), the three-way interaction was no longer significant (p=.056), which arose because the counterintuitive interaction pattern of increasing CU traits and high maternal praise in the low aggression group was substantially attenuated (reduced from β= .22, p=.112, to β= .07, p=.610). The size and significance of the hypothesised two-way interaction in the high aggression group slightly increased (-.24, p=.061).

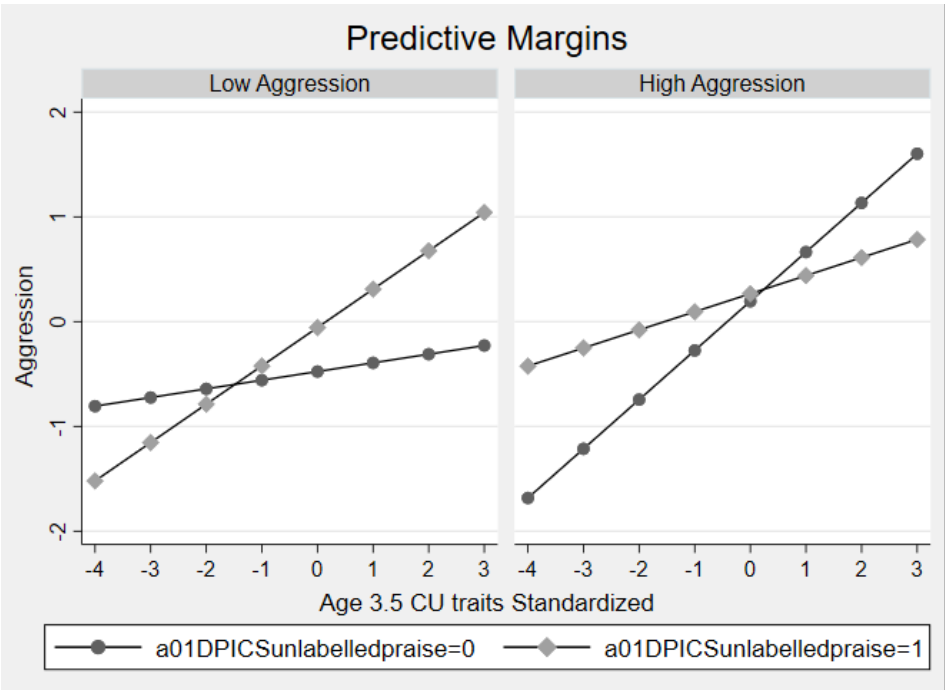

Figure 1. The association between age 3.5 CU traits and age 5.0 aggression at high and low praise in children above and below the median on age 3.5 years aggression.

We then estimated the same regression models to test for moderation by maternal positivity, shown in Table 3. Similar to maternal praise there was no two-way interaction between positivity and CU traits. The three-way interaction between CU traits, aggression and maternal positivity was non-significant (p= .093), but we examined the two-way interactions between positivity and CU traits in the high and low aggression groups, and the interaction term in the high aggression group was significant (p= .045) (Table 4).

Table 3

Summary of hierarchical multiple linear regression models predicting age 5.0 years aggression from maternal positivity, CU traits and aggression.

	ΔR^2	p	Variable	β	p
Block 1	.14	<.001	Child sex	.11	.104
			Household income	-.04	.564
			Pacific region	-.01	.902
			Caribbean region	-.01	.949
			Maternal mood age 5.0	.35	<.001
Block 2	.30	<.001	Aggression age 3.5	.34	<.001
			CU traits age 3.5 years	.19	.005
			Maternal positivity	-.06	.265

Block 3	.02	.195	Aggression X CU traits 3.5	.08	.221
			Aggression X positivity 3.5	.11	.106
			CU traits X positivity	-.09	.206
Block 4	.01	.093	Aggression X positivity X CU traits	-.39	.093

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

Table 4

Summary of hierarchical multiple linear regression models predicting age 5.0 years aggression from age 3.5 years CU trait and maternal positivity in the high and low aggression groups.

	Low Aggression				High Aggression			
Variable	ΔR^2	p	β	p	ΔR^2	p	β	p
Block 2	.05	.081			.10	.002		
Maternal positivity			-.13	.183			-.03	.701
CU traits			.21	.072			.34	.001
Block 3	.01	.727			.01	.03		
CU traits X maternal positivity			.04	.727			-.18	.045

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2.

Figure 2 shows the association between age 3.5 CU traits and age 5.0 aggression at three levels of age 3.5 maternal positivity (at mean and 1 SD above and below), which shows that in the high aggression group the association between CU traits and age 5.0 aggression was attenuated in those with high maternal positivity. The analysis was repeated using the 12-item ICU (reported in the appendix) and the pattern of the results were the same, but the size of the effects was reduced, and all were non-significant.

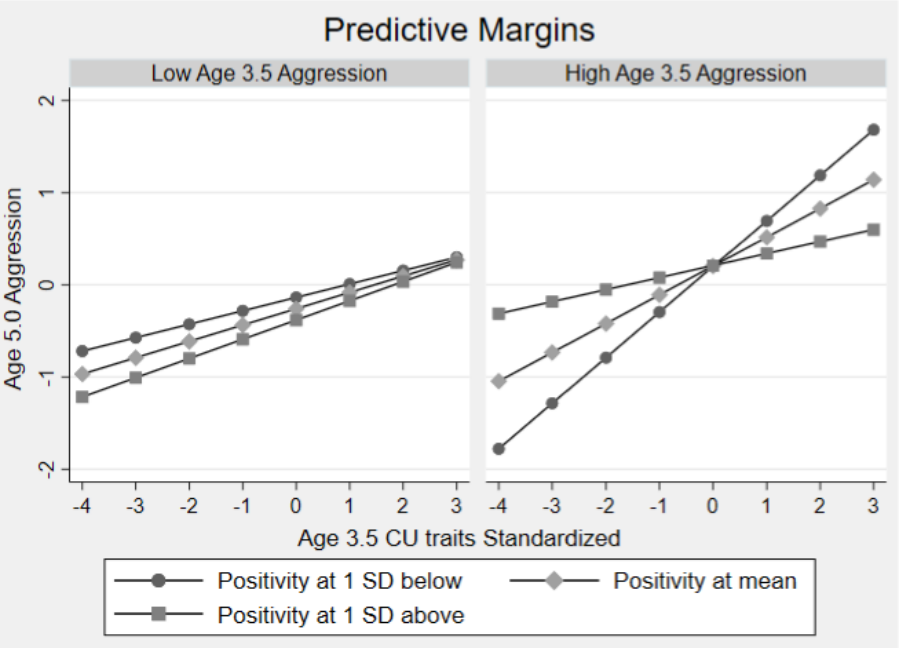

Figure 2. The association between age 3.5 CU traits and age 5.0 aggression at three levels of maternal positivity (at mean and 1 SD below and above) in children above and below the median on age 3.5 years aggression

5.5. Discussion

Against a background of inconsistent evidence as to whether positive parenting moderates the association between CU traits and CPs, we asked whether the protective effect of positive parenting may be seen specifically in children who are already aggressive. In relation both to maternal praise and maternal positivity (warmth and reciprocity), in children who were already aggressive, the prospective association between CU traits at age 3.5 years and aggression at 5 years was reduced in the presence of positive parenting, consistent with our hypotheses. However, similar to findings from Hyde et al. (2013) where a moderating effect from positive parenting was not identified, the interpretation of the two-way interactions in the high aggressive children of the present study was not straightforward and the evidence on whether this represented a difference between the low and high aggression children was not clear, and both are discussed below.

In relation to the two-way interactions, their effect sizes were very similar (praise β= -.19; positivity β= -.18), and as shown in Figures 1 and 2, they were generated by the same pattern of differences between high and low positive parenting. The values of 'p' fell either side of the conventional significance level (praise p= .097; positivity p= .045). However, consistent with the American Statistical Society's case that scientific conclusions should bring many contextual considerations into play and should not be based only on whether a p-value passes a specific threshold (Wasserstein, & Lazar, 2016), taken together, the effects sizes, the figures and the values of p suggest very similar findings for both indices of positive parenting. The figures are also very similar in showing not only a greater level of aggression among children with high CU traits with parents low in positivity, but also lower level of aggression in the presence of low CU traits in the children of low positivity mothers. This was not predicted. Analyses for the contrast between low and high levels of aggression at age 3.5 years did not yield consistent evidence. The three-way interaction for maternal praise was significant, however, as was evident from Figure 1, this arose in part from a puzzling effect in the presence of low aggression

whereby CU traits were more strongly associated with later aggression in the presence of high, contrasted with low, maternal praise. This puzzling pattern of associations was not however seen when analyses were conducted using the 12-item ICU, and the corresponding 3-way interaction, while still evident also became non-significant. We therefore conclude that our findings provide good evidence that positive parenting attenuates the association between CU traits and later aggression, in children who are already aggressive, but they do not provide clear evidence for a contrast with children with lower levels of aggression.

Strengths of the study include the use of a prospective design in which parenting at 3.5 years was observed, thus reducing possible shared method variance effects on the rating of parenting and psychopathology. This is the first study to examine whether positive parenting moderates the association between CU traits and CPs in a LMIC setting. Both positivity and praise showed the expected negative association with CU traits found in HICs. Participants were recruited across three contrasting regions, and a widely available medium was used for recruitment, yielding a sample that in many aspects was representative of the general population of Colombia. The rate of low socioeconomic status (SES; 45%) was similar to those in published studies in Colombia (Buitrago-Lopez et al., 2015), and the numbers from rural districts (15%) were similar to national statistics (15.8%; DANE, 2018). The prevalence of self-reported Indigenous or Afro-Colombian status (14%) was very close to the national estimate of 14.4% (DANE, 2018). A third of the sample reported experiencing community violence or displacement. The sample differed, however, in that 50% of mothers and 48% of fathers had a university degree, contrasted with 22% in the general population (Organisation for Economic Co-operation and Development - OECD, 2018). Thus, although we contacted parents through social media almost universally accessed by the general population, participation was probably biased towards more highly educated parents, limiting the generalizability of the findings.

Statistical power for the hypothesised three-way interaction was modest, which created challenges in evaluating statistical significance, and created risks not only of Type 1 but also Type 2 errors. We know that the association between parenting and both CPs and CU traits is bidirectional (Waller et al., 2014; Hawes et al., 2011) and this may change over development with certain parenting behaviours potentially becoming more or less relevant to the emergence versus the maintenance of CU traits and CPs (Waller et al., 2015). Analyses which can take into account parenting behaviours at the outcome age, and continuity or discontinuity in parenting behaviour over time, are needed.

In interpreting our findings, it is important to highlight those that we did not predict, and which require further explanation. As we noted, the paradoxical finding that high praise was associated with increased age 5.0 aggression with increasing CU traits in the low age 3.5 aggression group was unexpected and difficult to explain. However, it was not seen (interaction term reduced from $\beta = .22$ to $\beta = .07$) in the analysis using the 12-item ICU total. The 12-item total has been shown to be the best fitting factor structure for the ICU in pre- and school-age children. It removes five of the six items from the unemotional scale, which has been found to show opposite to expected associations with external correlates and has been speculated to assess shy and withdrawn behaviour rather than unemotionality as it is conceptualised in CU traits (Waller et al., 2015; Ezpeleta, de la Osa, Granero, Penelo, & Domènech, 2013).

Five of the other excluded items refer to unconcern about performance, whilst this component of CU traits has been included in the DSM *limited prosocial specifier* CPs, it is not included in most conceptualisations of CU traits or psychopathic traits (Colins et al., 2014; Hare, 1991; Levenson, Kiehl, & Fitzpatrick, 1995). It may be that the unconcern about performance items are less relevant to pre- and school-aged children. However, a similar 11-item version (excluding the one remaining unemotional item) has been shown to be the best fitting factor structure of the ICU in Chinese adolescents and undergraduate students (Wang et al., 2019; Zhang et al., 2019) and Chinese and UK 10-11 years old (Allen, Shou, Wang, & Bird, 2020).

Therefore, unexpected finding may be largely driven be the items which are less central (unconcern about performance) and poorly representative (unemotional) of the CU traits construct. However, a small but significant puzzling main effect of high maternal praise on age 5.0 years aggression was observed in analyses using both the 12 and 24-item ICU scales. The bivariate association between praise and aggression was non-significant and negative, suggesting that this finding arose from modelling praise, age 3.5 years aggression and CU traits together.

As we noted earlier, there are strong theoretical reasons to suggest that positive parenting will be protective for CPs or aggression in children with elevated CU traits. Drawing on behavioural and neurological evidence that individuals with CU traits are less responsive to punishment but may be more responsive to reward (Blair, 2001; Frick & White, 2008), Reidy et al. have argued specifically for a role for positive reinforcement of prosocial behaviour, suggesting that it may be a particularly relevant restraint on antisocial behaviour amongst individuals with CU traits due to their reward-dominant processing style. Work on the development of conscience (Kochanksa, 1997; Kochanska et al., 2013) has suggested that warm and mutually responsive positive parenting may reduce antisocial behaviour by promoting the internalisation of social rules, but only in children who are at risk for the developmental of aggressive behaviour (temperamentally fearless children). Whilst some existing studies have examined the moderation between positive and parenting and CU traits in CP or aggressive samples (Pardini et al., 2007; Pasalich, Dadds, Hawes, & Brennan, 2012), the majority have used general population or samples at elevated risk due to sociodemographic variables and have been based on the expectation that CU traits are related to later aggression as a main effect. Our previous findings across Colombian and UK samples were consistent with that assumption but also indicated that the strength of the association between CU traits and later aggression was much stronger in the presence of pre-existing aggression. This novel finding in young children, that we replicated across informants and in Colombian and UK samples created a new context for the study of the role of positive parenting. This heterogeneity may account at least in part for

the negative findings in relation to CU traits as a main effect. If as our findings suggested, CU traits occurring in children with low levels of aggression, do not create increased risk for later aggression, then in those children there will be little or no effect to be modified by quality of parenting. The findings reported here are consistent with, but do not provide conclusive evidence in support of, this explanation. However, they do indicate that further study of the role of parenting in children who have high levels of CU traits and aggression or CPs, is warranted, both because this seems to be a particularly high-risk group and because it may be particularly responsive to positive parenting, and hence to interventions to promote positive parenting. The best evidence for the moderating role of parenting will come from intervention studies. In a recent publication, Kimonis et al. (2019) reported that an adapted parent-child interaction therapy designed to promote positive parenting produced reductions in CP in pre-schoolers with CU traits, which were sustained at a 3-month follow-up. Future investigations which employ longer term follow-up are needed to inform whether targeting positive parenting will result in persistent reductions in CPs in children with CU traits.

5.6. References

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5.7. Appendix

Table A1

Bivariate associations, Pearson's and tetrachoric, between transformed study variables and descriptive statistics on untransformed variables.

	Positivity	High praise	Aggr. 3.5 yrs.	Aggr. 5.0	ICU-24 age 3.5	ICU-12 age 3.5	Maternal mood	Low-Income	Male sex
Praise	.12+								
Aggression 3.5	-.15	-.16*							
Aggression 5.0	-.16*	-.02	.49**						
ICU-24 3.5 yrs.	-.18*	-.14*	.40**	.40**					
ICU-12 3.5 years	-.13*	-.16*	.38**	.36**	.91**				
Maternal mood	-.04	-.12+	.39	.35**	.28**	.24**			
Low-income	.01	-.21*	.13+	.12+	.21**	.17**	-.23**		
Male sex	-.16*	.01	.05	.15*	.07	.17**	-.03	.01	
Mean	3.27		1.36	16.01	13.85	7.11	6.17		
SD	1.11		.50	8.71	8.06	4.88	4.49		
N	235	235	235	235	220	235	220	235	235
%		52%						40%	51%

+ p <.08; * p <.05; ** p <.01; Aggr.= aggression; yrs.= years.

Table A2

Summary of hierarchical multiple linear regression models predicting age 5.0 aggression from age 3.5 years 12-item CU traits, aggression, and maternal praise.

	ΔR^2	p	Variable	β	p
Block 1	.13	<.001	Child sex	.10	.107
			Household income	-.04	.515
			Pacific region	-.01	.932
			Caribbean region	-.01	.989
			Maternal mood age 5.0	.35	<.001
Block 2	.32	P<.001	Aggression age 3.5	.38	<.001
			CU traits age 3.5 years	.19	.005
			Maternal praise	.13	.037
Block 3	.01	.279	Aggression X CU traits 3.5	.07	.268
			Aggression X praise 3.5	-.01	.967
			CU traits X praise	-.12	.204
Block 4	.01	.056	Aggression X praise X CU traits	-.16	.056

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

Table A3

Summary of hierarchical multiple linear regression models predicting age 5.0 aggression from age 3.5 years CU traits and maternal praise in high and low aggression groups.

	Low Aggression				High Aggression			
Variable	ΔR^2	p	β	p	ΔR^2	p	β	p
Block 2	.09	.084			.13	<.001		
Maternal praise			.15	.097			-.03	.771
CU traits			.18	.070			.30	.002
Block 3	.01	.610			.04	.017		
CU traits X praise			.07	.610			-.24	.061

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2.

Table A4

Summary of hierarchical multiple linear regression models predicting age 5.0 years aggression from age 3.5 years 12-item CU traits, aggression, and maternal positivity.

	ΔR^2	p	Variable	β	p
Block 1	.13	<.001	Child sex	.11	.103
			Household income	-.4	.515
			Pacific region	-.01	.932
			Caribbean region	-.01	.989
			Maternal mood age 5.0	.35	<.001
Block 2	.17	P<.001	Aggression age 3.5	.35	<.001
			CU traits age 3.5 years	.18	.007
			Maternal positivity	-.08	.204
Block 3	.01	.271	Aggression X CU traits 3.5	.09	.167
			Aggression X positivity 3.5	.06	.174
			CU traits X positivity	-.05	.416
Block 4	.01	.288	Aggression X positivity X CU traits	-.07	.288

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2, and Block 3 effect from a model with all three Blocks.

Table A5

Summary of hierarchical multiple linear regression models predicting age 5.0 years aggression from age 3.5 years CU traits and maternal positivity in high and low aggression groups.

	Low aggression				High aggression			
Variable	ΔR^2	p	β	p	ΔR^2	p	β	p
Block 2	.09	<.001			.23	<.001		
Maternal positivity			-.14	.177			-.06	.480
CU traits			.12	.235			.29	.100
Block 3	.01	.715			.02	.152		
CU traits X maternal positivity			.04	.716			-.13	.153

Note: Block 1 effects were generated from a model with only Block 1, Block 2 effect from a model with Block1 plus Block 2.

Chapter 6: Exposure to community violence and CU traits: the role of positive parenting

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6.1. Abstract

Studies of possible environmental contributions to the development of Callous-unemotional (CU) have provided reasonably good evidence for a protective role for positive parenting. It is not known, however, whether findings from these studies conducted in High-Income Countries (HICs) will generalise to Low and Middle-Income Countries (LMICs). Exposure to community violence is common in LMICs and is associated with emotional and behavioural problems in children and so, in these contexts, may be an important environmental risk for CU traits. In this study, we investigated whether positive parenting has a protective role in relation to CU traits in young Colombian children whose families have been exposed to community violence. We conducted *La Sabana Parent-Child study* in which 235 children aged 3.5 years, from three contrasting regions of Colombia, were assessed using observations of mother-child interactions at age 3.5 years and maternal reports at ages 3.5 and 5.0 years. Maternal report of community violence provided information on neighbourhood violence and whether the family had been victim of guerrilla or criminal bands activities. Maternal positivity during play at 3.5 years was associated with lower CU traits at age 5.0 years only in children of families exposed to community violence (interaction term p= .001). In the exposed group maternal positivity explained 10% of the variance (β= -.34, p= .001) with low positivity associated with elevated CU traits and high positivity with low CU traits. Maternal praise during a tidy up task was not associated with CU traits. However, maternal negativity during play was associated with elevated CU traits as a main effect. Based on these findings, whether or not exposure to community violence is associated with elevated CU traits depends on maternal positivity, with low positivity creating vulnerability, and high positivity, resilience.

Key words: Callous-unemotional traits, exposure to community violence, positive reinforcement, low- and middle-income country.

6.2. Introduction

Low of concern for others' distress and lack of guilt regarding the impact of one's harmful behaviour, commonly referred to as 'Callous-unemotional' (CU) traits, are associated with a distinct vulnerability for child conduct problems (CPs) (Frick, Ray, Thornton, & Kahn, 2014), an important focus of research because they commonly persist and give rise to a wide range of adverse outcomes later in life (Hill & Maughan, 2015; Tremblay, 2010). Most of the evidence regarding processes contributing to the development of CU traits come from countries characterised as 'High-Income' Countries (HICs) by the World Bank (2020), and little is known about the shared and distinct risks for CU traits in 'Low and Middle-Income' countries (LMICs). The study reported here, *La Sabana Parent-child Study,* aims to establish whether CU traits are a valid and informative construct in the LMIC setting of Colombia (Obando, Wright, Pickles, & Hill, 2020a; Obando et al., 2020b), and whether there are potential environmental contributions that are shared and distinct in the Colombian, compared with HIC settings. In this paper, we report on prospective associations between observed positive and negative parenting at age 3.5 years, and subsequent exposure to community violence, and CU traits at age 5 years.

6.2.1. Development of CU traits

Studies from HIC settings have shown strong genetic contributions to CU traits which however may be modified by positive parenting (Hyde et al., 2016; Takahashi, Pease, Pingault, & Viding, 2020; Waller et al., 2016). More generally, developmental hypotheses and studies of parenting early in life and CU traits point to the role of positive parenting. Studies of parenting observed in infancy have shown prospective associations between maternal positivity and sensitivity and lower CU traits up to age 5.0 years (Bedford, Pickles, Sharp, Wright, & Hill, 2015; Wagner et al., 2019; Wright, Hill, Sharp, & Pickles, 2018). Using a measure of maternal utterances during play, higher mind-mindedness at 8 months was associated with lower CU traits at age 10 years based on children's reports (Centifanti, Meins, & Fernyhough, 2016). Assessments of maternal sensitivity, somewhat later in the preschool period, allowed Wagner,

Mills-Koonce, Willoughby, Zvara and Cox (2015) to examine whether positive parenting has an incremental effect after accounting for earlier CU traits. They found that higher maternal sensitivity observed at ages 24, 36, and 58 months was associated with lower CU traits in first graders after controlling for CU behaviours at the time of the sensitivity assessments.

In addition to possible main effects, positive parenting may be as important a modifier of other risks for CU traits. As noted earlier, genetic risk for CU traits has been shown to be reduced in the presence of positive parenting. Research using adoption designs with young children have shown that adoptive mothers' positive reinforcement modifies the association between biological parental antisocial behaviour and temperamental fearlessness and child CU traits (Hyde et al., 2016; Waller et al., 2016). The evidence is however, by no means conclusive. In a large prospective study using observational and self-report measures of parenting at age 2 years, when examined simultaneously, dimensions of harsh parenting but not positive dimensions significantly predicted CU traits at ages 3 and 4 years. However, higher maternal positive reinforcement and involvement, was also associated with lower CU traits (Waller et al., 2012). Similarly, a study with children from ages 3-10 years identified that parent- reported poor monitoring predicted increased CU traits, specifically in younger children (Hawes, Dadds, Frost, & Hasking, 2011).

Possible differences in mechanisms for CU traits across ethnic groups within the same country have been identified (Kimonis, Frick, Munoz, & Aucoin, 2008). However, very little is known about CU traits outside HICs. A small number of studies have provided evidence for the reliability and validity of established measures of CU traits with older children and adolescents in LMICs (Amador & Padrós, 2019; Wang et al., 2019). In previous publications from *La Sabana Parent-Child Study* we have reported that the factor structure of a widely used measure of CU traits, the Inventory of Callous Unemotional Traits (ICU; Frick, 2004), is similar to that found in HIC studies (Kimonis et al., 2016; Obando et al., 2020a). We also showed that higher CU traits assessed using the ICU at 3.5 years predict child aggression at age 5 years after

accounting for age 3.5 years aggression, supporting the validity of the CU traits construct and measure in an LMIC setting (Obando et al., 2020b). Furthermore, in a test of cross-cultural robustness, we showed that the prediction from CU traits to aggression at 5.0 years was significantly greater in the presence of high aggression at age 3.5 years in the Colombian sample and in the UK Wirral Child Health and Development Study (Obando et al., 2020b). In the UK study this effect was seen for same-informant (maternal) reports at ages 3.5 and 5.0 years, and for cross-informant report, by mothers at age 3.5 years and fathers at age 5.0 years.

6.2.2. Exposure to community violence

Although the evidence summarised so far points to individual and intra-familial contributions to CU traits, in many children, antisocial behaviours develop in the context of wider contextual factors, particularly community violence. The Report on Violence and Health from the World Health Organisation (WHO, 2002) describes community violence as a public health concern, with adverse effects on children's emotional, social, academic, behavioural, and cognitive processes (Sharkey, Schwartz, Ellen, & Lacoe, 2014). Associations between community violence in the form of muggings, knifing, shooting and child adjustment problems, both internalising and externalising, have been extensively documented and well-replicated across a large number of studies (e.g., Fleckman, Drury, Taylor, & Theall, 2016; Mohammad, Shapiro, Wainwright, & Carter, 2015).

Most of the studies have been with school aged children and adolescents, so that relatively little is known about whether community violence similarly affects preschool children who may be more protected in their families than older children. Studies with preschool children have provided more inconsistent findings than those with older children. For example, Linares et al. (2001) found a cross-sectional association between community violence and maternal report of externalising behaviours in 160 children at age 3-6 years, although this association was markedly reduced and became non-significant after controlling for maternal depressive symptoms. Shahinfar, Fox and Leavitt (2000), also using a cross-sectional design, showed that

community violence in a USA sample of 155 pre-schoolers was associated with higher parental reports of aggression. However, the association was seen in relation to 'mild' community violence, such as beating, pushing, and slapping, but not 'severe' violence such as robbery, threats, and shooting. By contrast, in a prospective study of 625 South African children, community violence assessed at age 5 years was associated with parent-reported aggression one year later (Barbarin, Richter, & DeWet, 2001).

Studies of younger children also bring out issues of measurement which may give rise to inconsistencies. Unlike older children and adolescents where self-report is likely to be valid, this is less clear during the preschool period. Shahinfar et al. (2000) devised a method for enquiring about community violence with their preschool participants, but it showed no agreement with parent reports. Barbarin et al. (2001) asked community experts to categorize each of the communities from which children were drawn for the study using a Q-sort procedure. In a study of young school age children ages 7-11 years, Cuartas and Leventhal (2020) used police records to identify exposed and unexposed children in the same areas of a city, as a way of dealing with confounding by family socioeconomic factors.

6.2.3. Community violence and CU traits

Psychological and biological mechanisms that might link community violence to CU traits have been proposed, including that exposure leads to desensitization to the effects of violence on victims (Davis, Ammons, Dahl, & Kliewer, 2015), or a coping strategy involving a reduction in processing of others' social and emotional cues (Hill, Murray, Leidecker, & Sharp, 2008), or downregulation of physiological and neurobiological responsivity (Hill & Maughan, 2015; Saxbe et al., 2018). Studies in adolescence have shown an association between community violence and CU traits (Davis et al., 2015; Kimonis et al., 2008), although as far as we are aware, none has been conducted with children.

6.2.4. Community violence in Colombia

After almost 60 years of armed conflict, and despite the conclusion of the peace process in 2016, there are still high levels of community violence in Colombia. The Colombian population continues to be exposed to violence and displacement, particularly as a result of criminal bands and drug traffickers fighting to control Colombia's lucrative illegal-narcotics and mining industries, and targeting union organizers, indigenous leaders, environmentalists, and community activists for speaking up and opposing their presence (Ortega-Guerrero, 2018). During 2019, almost 500.000 persons were victims of thefts, personal injuries, thefts, and homicides (Policía Nacional de Colombia, 2020), and 17% of the Colombian population in the last years has been direct victim of the internal armed conflict (Unidad para las Víctimas, 2018).

Studies conducted in Colombia have shown associations between community violence and child mental health problems in school aged children. In a study conducted with 1235 children and adolescents from Bogotá, exposure to community violence was associated with both reactive and proactive aggression (Chaux, Arboleda, & Rincón, 2012). More recently, and after the conclusion of the peace process, Cuartas and Leventhal (2020) conducted a study of 404 children aged 7-11 years and found that an incident of violent crime in close proximity to children's homes was associated with a small to medium effect size increase in children's mental health problems.

6.2.5. The role positive parenting in relation to exposure to community violence

Several studies of the association between community violence exposure and child aggression have reported moderation by positive parenting, possibly indicative of a protective effect. These include studies of resilience to exposure to military violence in Palestine (Punamäki, Qouta, Miller, & El-Sarraj, 2011) and Israel (Slone & Shoshani, 2017), and community violence in South Africa (Barbarin et al., 2001). In a study of 13-year-olds, Davis, Ammons, Dahl and Kliewer (2015) examined the role of positive parenting on CU traits in a sample of 236 low-income youth. The authors found a positive association between witnessing

and hearing about community violence and CU traits, and a negative association between supportive relationships with caregivers and CU traits, but no moderation by caregiver relationships of the link between community violence and CU traits. In this study, as in all others of possible protective effects of positive parenting in the community violence, supportive relationships were assessed by self-report perceived support, not as observed parenting.

6.2.6. Current study

In summary, studies in HICs have examined associations between observed positive and negative parenting and CU traits but this has not so far been extended to LMIC settings. Prospective studies of exposure to community violence and CU traits in preschool children accounting for pre-existing CU traits have not previously been conducted, either in HIC or LMIC settings, nor has the potential protective role of observed positive parenting been examined. In this paper, we examine the hypotheses: First, that positive parenting at age 3.5 years, either positive reinforcement or warm parenting, will be associated with lower CU traits at age 5.0 years. Second, positive parenting will modify the association between community violence and CU traits consistent with a protective effect. Third, consistent with the specific role of positive parenting in CU traits, negative parenting will not be associated with CU traits.

6.3. Methods

6.3.1. Participants and Procedure

Participants were recruited through Facebook groups where mothers are likely to actively participate (e.g., Latin Women League and More Moms Colombia). It is estimated that 91% of the Colombian population between the ages of 14 and 65 have access to Facebook (Ministerio de Tecnologías de la Información y las Comunicaciones, 2018). A total of 344 parents responded to the invitation, 40 of those were excluded as children did not meet the age inclusion criteria, and of the remaining 304, 235 (77.3%) agreed to participated and provided full data. Children's average age at baseline was 3.31 (SD= .48), 52% were boys, and the mothers' average age was

30 years (SD= 6.29). Follow-up was conducted 18 months after the initial assessment with 220 of the families (93%) (mean age= 4.86; SD=. 42, 49% boys).

Participants were from three Colombian regions, each representing different cultural and demographic features. The Central region (n= 96) is characterised by lower levels of poverty in the country, and it is predominantly *mestizo* (mix of European and Indigenous) compared to the Pacific (n= 69) and Caribbean (n= 70) which have increased levels of poverty and extensive numbers of Afro-Colombian and Indigenous inhabitants (Ministerio de Ambiente y Desarrollo Sostenible, 2013). The majority (77%) were two parent families, 50% of mothers and 48% of fathers had studies beyond school, and 15% of the participants lived in rural areas. Household income was operationalised based on the Colombian government system that designates 1 to 6 categories (1 the lowest) determined by housing conditions and basic public services (Departamento Administrativo Nacional de Estadística - DANE, 2011). As categories 1 and 2 receive subsidies from the Colombian government they were merged to represent low-income families (45% of the study sample). Regarding participants ethnicity, 38% were mestizo, 9% Afro-Colombian, 5% Indigenous, 13% from 'other' ethnic groups, and 35% did not identify themselves as belonging to a specific group.

6.3.2. Ethical considerations

This research was conducted following the ethical principles and code of conduct for social sciences and was approved by the Research and Ethical Committee of the Psychology Department at La Sabana University through minute number 102, May the 3rd 2017. Participants were visited at home to receive detailed information about the study, to give informed consent and to complete questionnaires.

6.3.3. Measures

Parental report of Callous-Unemotional Traits. CU traits were measured at 3.5 years and at 5.0 years using the parent-report version of the Inventory of Callous–Unemotional Traits (ICU; Frick, 2004). This inventory has 24 items scored using a 4-point scale (0= not at all true,

1= somewhat true, 3= very true, and 4= definitely true). Evidence for the reliability and validity of the ICU total score in preschool children in a HIC setting has been provided from a cross-sectional study by Kimonis et al. (2015). In this Colombian sample, we replicated the best-fitting factor structure reported in Kimonis et al. (2015), a 12-item two-correlated factor structure, and found similar internal reliability (Obando et al., 2020a). Kimonis et al. conducted validity analyses with both the 12 and 24-item totals and found similar results for both. We tested and replicated the same two-correlated factor structure in the age 5.0 years (Supplementary Material). In line with the recommendations of Ray, Frick, Thornton, Steinberg and Cauffman (2016) we conduct the main analysis using the total 24-item ICU scale, but report the results using the 12-item total in the appendix. The internal consistency in this sample for the 12-item total is α= .71 at age 3 and α= .78 at age 5, and for the 24-item total it is α= .82 at age 3 years, and α= .85 at age 5 years. The Spanish version of the inventory was shared by the authors, who approved its use in the present study.

Observation of mother-child interactions. Video recordings were made of mothers and children in a standardized procedure used previously in National Institute for Child Health and Development studies (NICHD; Child Agency code from NICHD Early Child Care Research Network, 1999). Parents and children were provided with three bags of toys which they are asked to play with in a pre-set order over 15 minutes, and then a pre-agreed signal the child is asked to tidy up the toys. Mother-child play was rated using the Parent-Child Interaction System (PARCHISY; Deater-Deckard, 2000) generating a maternal positivity score as the average of positive affect and reciprocity, and negative as the average of negative affect and conflict (Deater-Deckard, Li & Bell, 2016). Unlabelled praise during tidy-up was assessed using the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, Nelson, Duke, & Boggs, 2004). Research assistants in Colombia were trained by reliable UK coders, and high agreement between them on 30 independently rated recordings in English from the UK was achieved (all

ICCs >= .78). There were too few instances of labelled praise in either UK or Colombian studies for reliability analyses.

Exposure to Community violence. Most studies of community violence have been of children and adolescents old enough to complete self-report measures such as the Survey of Exposure to Community Violence (Richters & Saltzman, 1990). Studies of children aged 5 years and under, have used a wide variety of methods, including a Q-sort procedure to categorize levels of violence in each of the communities from which children were drawn (Barbarin et al., 2001), and a latent variable derived from several indices of local crime, social disorder and witnessed violence (Linares et al., 2001). In view of this variability and to include exposures likely to reflect conditions in Colombia over the period from baseline to follow up, we devised a four-item measure designed to reflect experiencing major violence or disruption. The questions asked whether over the past two years there had been 'Fights' or 'Assassinations, kidnapping or disappearances' in the neighbourhood, and whether the family had been directly affected by 'Activities of guerrillas or criminal gangs' or a 'Victim of forced displacement'. Of the 220 followed-up when their children were aged 5.0 years, 55 (25%) endorsed one of these items, and 26 (12%) two or more. A simple present-absent binary variable was used in all analyses.

Maternal depressive symptoms. Maternal mood was measured for mood related biases in reports of child behaviours. The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsy, 1987) has been designed to assess mood over periods when mothers may experience symptoms associated with childbirth and was used in part because participating mothers were likely to be pregnant or have recently had further children. The measure is widely used during the prenatal and postnatal periods with parents of young children (Huntley, Wright, Pickles, Sharp, & Hill, 2017). Internal consistency of the Spanish version of the EPDS was good in a previous study of Colombian women (α= .78; Campo-Arias, Ayola-Castillo, Peinado-Valencia, Amor-Parra, & Cogollo, 2007) and in this study (α= .83).

6.3.4. Statistical analyses

Where possible, skewed variables were transformed for parametric analyses. Transformations of PARCHISY maternal negativity and DPICS unlabelled praise did not correct skewness. Bivariate analyses were conducted using non-parametric statistics, and hypothesis testing models included binary variables based on a median threshold for maternal negativity and praise. Confounding of association between community violence and child mental health problems by family demographic characteristics is a potential hazard in interpreting these associations. Based on available evidence, we identified low family-income and limited paternal and maternal educational levels as potential confounds for exposure to community violence. Region was also examined as a potential confound, and child sex and maternal age were also included in adjusted models. Maternal and paternal education were operationalised as binary variables (0= high school education or low, 1= education beyond high school) as was income (0= 1or 2 DANE classification, 1= 3+ classification). Region was included as dummy variables, child sex as binary (1= male and 2= female) and mothers age and depression symptoms as continuous.

6.4. Results

Community violence was associated with low income (OR= 2.82, 95% CI 1.62-4.91, p <.001), limited paternal education (OR= 3.26, 95% CI 1.74-6.12, p <.001) and limited maternal education (OR= 1.97, 95% CI 1.08-3.61, p= .026). In logistic regression, both low income and limited paternal education predicted community violence, and so for analysis a binary variable reflecting either was used which was strongly associated with exposure to community violence (OR= 3.43, 95% CI 1.93-6.10). Limited maternal education was not considered further to reduce the number of confounding variables included in the models.

Bivariate associations are shown in Table 1. Notable features include that there were weak negative associations between observed positivity and praise and CU traits, and a somewhat stronger positive association between maternal negativity and CU traits. Reported community violence was associated with CU traits at 3.5 years but the association with CU traits at 5.0 years was small and non-significant.

Table 1

Bivariate associations, Spearman's rho between study variables and descriptive statistics.

	Positivity	Praise	Negativity	CU traits 3.5 yrs.	CU traits 5.0 yrs.	Maternal mood	Maternal age	Low-Inc/ lim. edu.
Praise	.119+							
Negativity	.045	-.100						
CU traits 3.5	-.171**	-.154*	.147*					
CU traits 5.0	-.109	-.105	.192**	.452**				
Maternal mood	.121+	-.147*	.060	.277**	.393**			
Maternal age	.04	.14*	-.03	-.17*	-.11	-.33**		
Low-income/ limited father education	.030	-.097	.109	.214**	.079	.086	-.27**	
Community violence	.030	-.097	.109	.214**	.079	.086	-.10	.26**
Male sex	-.16*	.02	.05	.15*	.07	-.03	.03	
Mean	3.27	1.33	1.36	16.01	13.85	6.17	30.04	
SD	1.11	1.91	.50	8.71	8.06	4.49	6.29	
N	235	235	235	235	220	220	227	

+ p <.08; * p <.05; ** p <.01; yrs.= years; Low-Inc= Low-income; Lim. Edu.= Limited father education.

In hierarchical multiple linear regression predicting CU traits at age 5.0 years, consistent with the bivariate analyses, there were no main effects of observed positive parenting nor of community violence (Table 2). There was a statistically significant interaction between exposure to community violence and maternal positivity, but not between exposure to community violence and maternal praise both prior to and after inclusion of potential confounds. Importantly, in the light of concerns about confounding of family demographics and community violence, inclusion of the binary family income/limited father education did not materially alter this association. The interaction is illustrated in Figure 1.

Table 2

Summary of hierarchical multiple linear regression models predicting CU traits at age 5.0 from observed maternal positivity and praise and their interaction with exposure to community violence.

	Unadjusted models R^2: .11				Adjusted Models R^2: .32			
Variable	ΔR^2	p	β	p	ΔR^2	p	β	p
Block 1	.04	.084			.02	.212		
Maternal positivity			-.12	.085			-.07	.270
Maternal praise			-.05	.516			.04	.486
Maternal negativity			.14	.043			.14	.026
Community violence			.04	.559			-.01	.868
Block 2	.10	<.001			.04	<.001		
Community violence X maternal positivity			-.39	<.001			-.26	.001
Community violence x maternal praise			.02	.314			.020	.828
Community violence X Maternal negativity			.11	.314			.02	.869

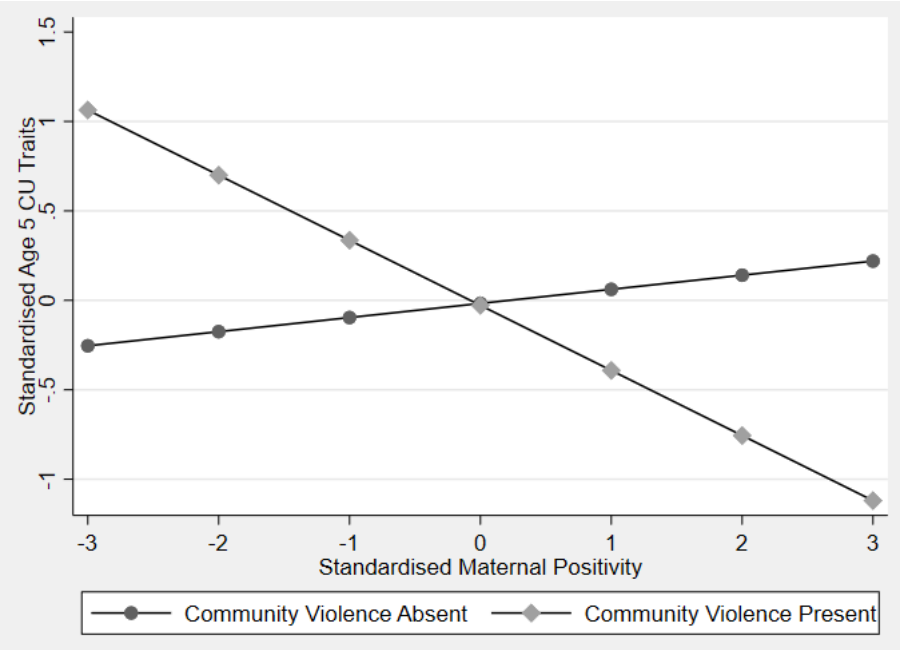

Figure 1. The association between maternal positivity and CU traits in exposed and unexposed children and showing a protective effect of maternal positivity among children in neighbourhoods with community violence.

Among those exposed to community violence, increasing maternal positivity was strongly associated with decreasing CU traits (b= -.466, p<.001), while there was no association in the unexposed group. Maternal negativity during play also made an independent contribution to the prediction of CU traits, and there was no interaction between negativity and community violence. The left side of the table shows unadjusted models. The right side of the table shows models adjusted for Time 1 (age 3.5 years) CU traits, household income/low paternal education, Colombian region, maternal age, child sex, and Time 2 (5.0 years) maternal depressive symptoms (Table 3).

Table 3

Summary of hierarchical multiple linear regression models predicting CU traits at age 5.0 from observed maternal positivity and praise in community violence exposed and no community violence exposed groups.

	No community violence exposure Total model R^2: .25								Community violence exposed Total model R^2: .38							
	Unadjusted model				Adjusted model				Unadjusted model				Adjusted model			
Variable	ΔR^2	p	β	p	ΔR^2	p	β	p	ΔR^2	p	β	p	ΔR^2	p	β	p
Block 1	.01	.326			.03	.166			.25	<.001			.10	.010		
Maternal positivity			.11	.198			.10	.218			-.50	<.001			-.34	.001
Maternal praise			-.06	.498			.02	.762			-.02	.828			.04	.689
Maternal negativity			.10	.233			.13	.098			.22	.032			.17	.094

6.5. Discussion

In this prospective study of mothers and 3.5-year-old children in Colombia, there was not as hypothesised a significant association between positive parenting at 3.5 years and lower CU traits at age 5 years. However, as predicted, observed maternal positivity during play at age 3.5 years moderated an association between community violence exposure and CU traits, so that the highest CU traits were seen in children exposed to community violence with mothers with low positivity scores, and the lowest CU traits in exposed children with high positivity mothers. Unlabelled praise during the tidy up task did not moderate the association between community violence and CU traits. Contrary to our third hypothesis, maternal negativity during play predicted higher CU traits. These associations were seen prior to and after controlling for age 3.5 years CU traits, indicating an incremental effect of the baseline parenting variables, and after controlling for maternal mood at age 5 years to account for mood related bias in maternal reporting. Community violence exposure was not at random, with poorer families and families where fathers had limited education at higher risk. However, the observed effects were little altered in adjusted models.

The findings are consistent with previous evidence of a protective role for positive parenting in relation to CU traits in young children, and of a contribution from negative parenting (Hawes et al., 2011; Waller et al., 2012). They are also consistent with previous findings of moderation by positive parenting of risk for CU traits (Waller, Shaw, & Hyde, 2017). The effect was seen for maternal positivity and not for positive reinforcement, in contrast to previous findings of moderation of genetic risk for CU traits by positive reinforcement (Hyde et al., 2016; Waller et al., 2016).

Previous studies have not examined the role of community violence in relation to CU traits in young children, nor whether positive parenting is protective. Crucially, there is no previous evidence regarding these processes in LMICs where levels of community violence are commonly high (Westbrook & Harden, 2010). We have previously reported that the

psychometric properties of the ICU in this Colombian study are very similar to those found in HIC studies (Obando et al., 2020a), and that the contribution of CU traits to emerging child aggression is the same across Colombian and UK samples (Obando et al., 2020b), providing good evidence that CU traits make an important contribution to CPs beyond the HIC settings in which most studies have been conducted. Our findings therefore cast new light on the interplay between threats from outside of the family, parental support and the origins of CPs in children.

Strengths of the study included that the sample was recruited from three different regions in Colombia with contrasting demographic characteristics, via social media widely used by adults in the age range of mothers of young children, and the socioeconomic profile of the sample was similar to that for Colombia as a whole. We used a prospective design in which parenting at 3.5 years was observed, thus reducing possible shared method variance effects, and predictors of age 5.0 years CU traits could be examined after accounting for age 3.5 years CU traits.

Limitations included that participants had a higher level of education than that of the general population of Colombia. We were able to show that community violence exposure is associated with low income and limited parental education, and that the effects we report were not altered after controlling for these variables. However, there may be further confounds for community violence exposure that we did not measure, for example violence within the home, that could have altered the findings. It is a limitation that we did not use a standard measure of community violence because available measures are self-report questionnaires designed for use in older children and conducting a pilot study to identify its validity and reliability was beyond the scope if this study. However, the strong association between the measure used here and low income and limited parental education provides support for its validity.

In contrast to studies of older children, whether or not community violence is associated with elevated mental health problems in young children, remains to be established. In the studies

that we reviewed, there was considerable variation (Barbarini et al., 2001; Linares et al., 2001; Shahinfar et al., 2000) and none showed prospective associations controlling for baseline problems. Two key aspects of our findings may help clarify the reasons: first, that there was not a main effect of exposure, and second, that there was strong moderation by observed maternal positivity. The implication is that whether or not young children are affected may depend to a substantial degree on the quality of their relationships with their parents. The low levels of CU traits among exposed children who received high levels of maternal positivity are also noteworthy. We did not predict this effect and so we interpret with caution. However, one possibility is that children who are frightened by community violence turn to their parents for comfort more often than other children, and hence have more experiences of being cared for, thus increasing the protective effect of parental warmth.

In this study there were no associations between exposure to community violence and either positive or negative parenting. However other studies have found associations. For example, Mitchell et al. (2009) showing that young African American mothers of children between ages 3 and 5 years who are immersed in highly violent contexts present increased levels of harsh discipline. Furthermore, the association between harsh discipline and children internalising and externalising symptoms depended on the mothers' exposure to violence and not on directly on children's exposure. Differences in parenting dimensions found between these studies are probably related to the levels of exposure (low, moderate or high) and the type of violent circumstances to which mothers are exposed.

Further study is required to identify which aspects of parent-child interactions may be most important for children exposed to community violence in countries like Colombia. Equally, there is a need to refine and standardise measures of young children's exposure to community violence. Linking methods such as that used in a study from Bogotá using police records of violence in the immediate locality (Cuartas & Leventhal, 2020) to observational measures of

parent-child interactions could offer a powerful way of studying children at risk and their families in Latin America and similar settings.

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6.7. Appendix

Replicating the 12-item two-correlated factor structure of the ICU from Hawes et al. (2014). In Obando et al. (2020) we examined the psychometric properties of the ICU in this sample and at aged 3 years and tested the competing factor structures of the ICU reported in the literature. We found that the 12 item two-correlated factor structure proposed by Hawes et al. (2014) and shown to be the best fitting factor structure for 3-year-olds by Kimonis et al. (2016) fit the data best.

For this study we test whether that same factor structure shows acceptable fit to the sample at age 5 years. Following Obando et al. (2020) we used confirmatory factor analysis with weighted least squares estimation in Mplus versions 8.4 (Muthen & Muthen, 2017). The 12-item two correlated factor model fit the data well (RMSEA= .060, CFI =.97), the standardised factor loadings, which were all >.5, and correlation between the two factors are presented in Figure 1A.

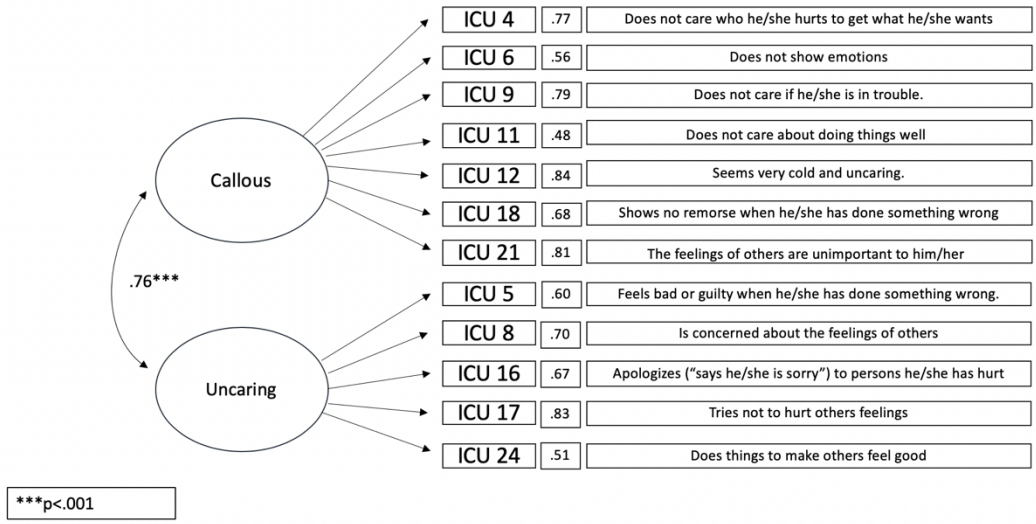

Figure 1A. Age 5.0 12-item two-correlated factor structure of the ICU with standardised factor loadings.

Table 1A

Summary of hierarchical multiple linear regression models predicting the 12-item CU scale at age 5.0 from observed maternal positivity and praise and their interaction with exposure to community violence. Total model R^2= .23.

	Variable	ΔR^2	p	β	p
Block 1		.03	.162		
	Maternal positivity			-.06	.357
	Maternal praise			-.05	.495
	Maternal negativity			.15	.021
	Community violence			-.01	.929
Block 2		.05	.004		
	Community violence X maternal positivity			-.29	<.001
	Community violence x Maternal praise			-.01	.944
	Community violence X Maternal negativity			.07	.469

Chapter 7: Discussion

This thesis had two main aims. First, to examine whether there are general and culture-specific processes regarding the role of Callous-unemotional (CU) traits in relation to conduct problems (CPs) and second, to examine whether positive parenting dimensions constitute a protective role in relation to CU traits and CPs and contextual risk factors. I developed *La Sabana Parent-Child* prospective study to address these research questions, with a sample of young children at age 3.5 years, followed-up at age 5 years. This study was conducted in Colombia, a country classified by the World Bank (2020) as a Low and Middle-Income Country (LMIC), which has been historically affected by an internal armed conflict, which has led to increased levels of violence and criminality across its communities. This setting enabled to examine whether findings from High-Income Countries (HICs) can be generalised to LMICs and whether contextual factors observed in this country increase the risk for antisocial behaviours.

Papers presented in this thesis addressed specific research questions. Since evidence outside HICs regarding the psychometric properties and validity of established CU traits measures, and the link between CU traits and parenting dimensions is lacking, papers 1 and 2 focused on these aspects. Initially, I explored the psychometric properties of the Inventory of Callous-Unemotional traits (ICU; Frick, 2004) and the contribution of positive parenting dimensions on CU traits (Paper 1, Chapter 3). In paper 2, I examined the validity of the ICU in Colombia, as incremental prediction before exploring the role of CU traits, characterised by children's indifference to other's distress (Frick, Ray, Thornton, & Kahn, 2014), on CPs, particularly on the development of aggressive behaviours (Chapter 4). Additionally, building on findings from Paper 2 and based on the contradictory evidence of which aspects of parenting are relevant to CU traits, papers 3 and 4 (Chapters 5 and 6) focused on examining the protective role of maternal positivity, a composite of warmth and reciprocity, and positive reinforcement/praise on the associations between CU traits and later aggression, and between the exposure to community violence and later CU traits.

7.1. Psychometric properties and validity of a measure of CU traits in young children from a LMIC

The ICU (Frick, 2004) is an extensively used measure validated in HICs that allows the identification of uncaring behaviours, absence of guilt and remorse after misbehaviour and unemotional dimensions of psychopathy (Ray & Frick, 2018). Most of the studies exploring the ICU psychometric properties include samples of children and adolescents, while limited studies have been conducted with young children (Ezpeleta, de la Osa, Granero Panelo, & Domènech, 2013; Kimonis et al., 2016). These studies have been mostly settled in HIC settings.

In the case of Colombia, no studies exploring either the psychometric properties nor the validity of this measure were identified. Studies from LMICs have examined the ICU self-report internal reliability in adolescents, but without testing factor structures previously identified in HICs (Amador & Padrós, 2019; Nwafor, Ibeagha, Anazonwu, & Obi-Nwosu, 2019). Studies from China, also classified as a LMIC by the World Bank, have explored previous structures reported in HICs and found that a two correlated factor 11-item scale obtained good fit for school-age children (Wang et al., 2019), detained adolescents (Zhang et al., 2019) and university students (Wang et al., 2017). Findings from this thesis provided evidence regarding the reliability and incremental validity of the ICU parent report in a sample of young children outside Westernised countries.

For the present study, we explored the ICU factor structures that were examined in HICs studies. Consistent with Hawes et al. (2014) we found the best fit for the two-correlated factor structure of the ICU in this sample of young children, which includes uncaring and callousness items and excludes 12 items mostly assessing unemotionality and unconcern about performance. The unemotional dimension has shown validity concerns in the preceding research (Deng et al., 2019). Waller, Hyde, Grabell, Alves and Olson (2015) proposed that this dimension does not adequately capture the unemotional component of CU traits. However, Ray, Frick, Thornton, Steinberg and Cauffman (2016) suggest that the two-factor solution is related to the used of

positively worded items in one scale and negatively worded items in the other. Consequently, Ray and Frick (2018) recommended the use of ICU the total scale when assessing CU traits. Hence, we examined the ICU 24-item psychometric properties and found good internal consistency for the present sample, similar to that reported in studies from HICs (Cardinale & Marsh, 2020; Deng et al., 2019). We conducted statistical analyses using both the ICU 24-item and the 12-item scales following Kimonis et al. (2016), who found that both versions showed similar validity in young children.

This study provided evidence for the first time of the ICU psychometric properties in a sample of preschool-aged children from a LMIC, implying that this measure is has similar factor structures as those found outside Westernised settings. Results add to a growing number of studies suggesting that the bi-factor structure of the ICU (three different dimensions: callousness, uncaring and unemotional, and a total score) is not supported in preschool and school-age children (Allen, Shou, Wang, & Bird, 2020; Hawes et al., 2014; Houghton, Hunter, & Crow, 2013; Willoughby, Mills-Koonce, Waschbusch, Gottfredson, & Family Life Project Investigators, 2015), and that the total score has appropriate internal reliability.

Paper 2, Chapter 4, examined the validity of the ICU in young children in Colombia, a LMIC. CU traits assessed using the ICU at age 3.5 years predicted increased levels of aggressive behaviour at age 5 years after controlling for aggression at age 3.5 years. In Paper 2, analyses were conducted not only on the Colombian but also the UK Wirral Child Health and Development Study in order test for replication. The incremental effect of CU traits was shown across two diverse cultures (the UK and Colombia) and across informants in the UK (mother and partner reports). It is noteworthy that CU traits were assessed using the Antisocial Processes Screening Device (APSD; Frick & Hare, 2001) in the UK and the ICU in Colombia. We found support for the incremental validity of these widely used measures in HICs research in samples of young children from both settings.

Literature review for the present thesis showed scarce studies exploring CU traits in young children from LMICs. One aspect that may be associated with this finding is the absence of valid measures to assess CU traits in this population. Providing evidence regarding the ICU validity and psychometric properties may lead to novel research with the possibility of comparing results with later studies from Westernised settings where the ICU is widely used. Likewise, identifying children with both CPs and CU traits must be a priority in countries showing high prevalence of externalising symptoms (e.g., Colombia) in order to provide early interventions in the clinical context and preventing programs focusing on positive parenting.

7.2. Specificity in the contribution of positive parenting on CU traits

Although it has been proposed that the absence of positive parenting dimensions rather than the presence of negative dimensions creates vulnerability to increased CU traits (Hawes, Dadds, Brennan, Rhodes, & Cauchi, 2013), the evidence is not conclusive, and the association has not been examined outside of HIC settings. To examine the specificity of parenting dimensions on CU traits, we used a self-report measure of positive and negative parenting dimensions, the Alabama Parenting Questionnaire (APQ; Frick, 1991). The APQ is an extensively used measure that has been validated in preschool and school-aged children in HIC settings (Hawes & Dadds, 2006). Clerkin, Halperin, Marks and Policaro (2007) proposed a version for preschool children (APQ-Pr) by removing items from the parental monitoring dimension as they are not relevant in young children.

We explored previous factor structures and psychometric properties of the APQ and found that both the four-factor including positive reinforcement, involvement, corporal punishment and inconsistent discipline and three-factor models (positive reinforcement and involvement as one factor) showed good fit to data. we used the three-factor model for the analysis in paper 2 (Chapter 3) with the two positive parenting dimensions combined as they were very highly correlated. Similarly, as reported by Cova et al. (2017) in a sample of Chilean children, we supported the 3-item corporal punishment scale previously found in school-age

samples. It is noteworthy that the inclusion of corporal punishment in this study was relevant as Colombian parents are thought to be more authoritarian and prone to children obedience by the use of punitive practices compared to other countries (Bornstein, Hahn, & Haynes, 2011; Lansford et al., 2010). Gershoff et al. (2010) pointed out that normativeness of punitive practices moderates the association between corporal punishment and child adjustment, as they found that the positive association between this parenting dimension and child maladjustment is weaker when cultural normativeness is higher.

Once we demonstrated that the APQ was reliable for this sample, we explored specificity on the contribution of positive parenting on CU traits. We found that positive but not negative parenting was cross-sectionally associated with CU traits even after accounting for ODD behaviours, punitive practices and inconsistent discipline and sociodemographic variables including region, socioeconomic status, maternal educational level, and maternal depression as a possible source of reporter bias (Paper 1, Chapter 3). The findings were consistent with the proposal that positive parenting may reduce vulnerability to CU traits as hypothesised for example by Henry et al. (2018) and Waller, Hyde, Klump and Burt (2018).

This finding supports the idea that positive parenting constates a protective role for CU traits and is in line with Clark and Frick (2016) cross-sectional study findings indicating that the most relevant parenting dimensions for CU traits are the positive ones. Conversely, the cross-sectional analysis showed that ODD behaviours were associated with negative but not positive dimensions of parenting after controlling for CU traits and positive parenting. To our knowledge, only the study by Clark and Frick (2016) with young children from HIC settings have explored the specificity of both positive and negative parenting to both CU traits and CPs. Therefore, this result in a sample of pre-schoolers from a LMIC setting is novel and provides support for unique mechanisms in which positive and negative parenting influence CU traits and CPs.

Mainly, it was found that the composite of positive reinforcement and parental involvement (positive parenting) was linked to decreased levels of CU traits. This is consistent

with findings from cross-sectional (Henry et al., 2018; Moore, Blair, Hettema, & Roberson-Nay, 2019) and prospective studies (Hyde et al., 2016; Waller et al., 2016) and with neurobiological evidence of a reduced response to punitive practices in children with CU traits (Blair, 2013; Reidy et al., 2017). Notably, positive reinforcement may operate by reducing negative behaviours as a response to a reward-oriented style in children who do not regulate aggression on the basis of empathy (Clark & Frick, 2016; Kochanska, Kim, Boldt, & Yoon, 2013). Also, positive reinforcement is thought to buffer negative outcomes by encouraging children's prosocial behaviours because of norms internalisation and compliance (Frick et al. 2014). Similarly, parental involvement may contribute on decreased CU traits by encouraging prosocial interactions (Frick, Cornell, Barry, Bodin, & Dane, 2003) and children's responsiveness to others' signals of distress (Waller et al., 2014). Findings from Paper 1 (Chapter 3) must be interpreted with caution as cross-sectional designs are not informative of the directions of influence between the study variables but provide information in relation to distinctive mechanisms involved in CU traits and CPs in young children.

Results of the present thesis regarding specificity of the contribution of positive parenting on CU traits are twofold. First, we provided evidence regarding the psychometric properties of the APQ in a LMIC setting, which is a widely used measurement to identify parenting dimensions in Westernised countries. Previous studies including Colombian samples frequently use parent report measures that has not been validated. Thus, novel research using the APQ in samples with similar features as those described for Colombia is projected. Second, results highlighted the relevance of positive parenting dimensions in counteracting the vulnerability for CU traits and the effects of negative environmental factors. In the context of clinical psychology, a key aspect of preventive programs and early interventions will be enhancing positive parenting practices based on the use of positive reinforcement, warmth affect, as well as reciprocal and involved interactions.

7.3. Synergistic effect of CU traits and aggression on later aggressive outcomes

In paper 2 (Chapter 4), we focused on role of CU traits in the developmental origins of CPs in young children because of the widely replicated finding that CP in young children carry greatly increase the risk of multiple poor outcomes in adolescence and adult life (Hill & Maughan, 2015; Odgers et al., 2008; Tremblay, 2010). Also, it has been shown that children with both CPs and CU traits are linked to more severe, chronic and stable antisocial and aggressive behaviours (Rowe et al., 2010) showing that CU traits may increase the risk for future CPs. As I reviewed in Paper 2, it is not yet clear how CU traits are linked to CPs or child aggression. Several studies have identified groups of children with CU traits without CPs implying that an additional vulnerability may be implicated, and several studies have provided some indications of what that might be. Another, largely unexplored possibility is that the principal way in which CU traits contribute to CPs or aggression is by leading to failures to moderate aggression among children who are already aggressive. This was tested across the Colombian and UK studies by examining the statistical interaction between CU traits and aggression at age 3.5 years in the prediction of aggression at 5.0 years. The findings were remarkably similar for mother report in Colombia, mother report and mother followed by father report, in the UK study. The association between CU traits and later aggression was substantially higher in the presence of aggression at age 3.5 years. The interaction terms were significant in the larger UK samples and non-significant in the Colombian sample. However, the effect size of the interaction in the Colombian study was larger than the effect based on mother report in the UK study, suggesting this was a consequence of lower statistical power in La Sabana study.

A literature search only yielded one previous study that examined synergy between CU traits and aggression. In that study by Dadds, Hawes, Frost and Fraser (2005) the synergistic effect of CU traits and CPs was shown in in young boys and older girls. This therefore was substantially a novel finding, which we replicated, suggesting it is robust.

Variations in behavioural patterns observed in children with both CPs and CU traits are probably related to a vulnerability created by CU traits due to the lack of empathy and unresponsiveness to others' distress. Aggressive children with low CU traits may inhibit aggression on the basis of their concern of the distress they cause in others. By contrast, unresponsiveness in children with elevated CU traits decreases the likelihood of desisting aggressive behaviours (Blair, 2003; Blair, 2013). Likewise, deficits in the mechanisms for inhibiting aggressive behaviours observed in children with increased CU traits and CPs may constitute a source of maintenance of aggressive behaviours over the time (Frick et al., 2014).

In summary, the findings of the first two papers support two notions. First, CU traits can be reliably assessed during early childhood, as proposed by Kimonis et al. (2016). The early identification of CU traits is key to prevent the future exhibition of more complex and adverse outcomes, making relevant the use of valid and accurate measures. In this regard, we confirmed that the ICU is a valid measure for evaluating CU traits among young children from LMIC settings, supporting the future use of the ICU in samples immersed in similar contexts as Colombia. Second, the early presence of CU traits in children with increased levels of aggression predicts future aggressive outcomes, supporting a major role for CU traits in the maintenance and amplification of aggression already established. By contrast, CU traits in the absence of aggression do not constitute a potential risk for future CPs.

7.4. The protective role of positive parenting

Although CU traits have been linked in a substantial degree to biological and genetic influences, preceding research indicates that environmental factors, particularly parenting practices, can modify these influences (Waller & Hyde, 2017; Waller et al., 2016). Results from earlier research in young children from HIC settings are informative of the association between increased levels of positive parenting dimensions and lower CU traits (Bedford, Pickles, Sharp, Wright, & Hill, 2015; Waller et al., 2014; Wright, Hill, Sharp, & Pickles, 2018). However,

evidence from preceding studies is dissimilar regarding the role of positive and negative parenting on CU traits.

On the basis of the results from cross-sectional analysis of this thesis that showed specificity of the contribution of positive parenting on CU traits, papers 3 and 4 (Chapters 5 and 6) prospectively explored this association focusing on the role of positive parenting. We assessed observed measures (a standardised observational assessment of the Child Agency code from NICHD Early Child Care Research Network, 1999) of parenting. Two novel hypotheses for both HICs and LMICs were tested: 1) the vulnerability for later aggression created by CU traits in the context of existing aggression can be ameliorated by maternal praise and positivity, and 2) maternal positivity and praise have a protective effect in the association between exposure to community violence and CU traits.

7.4.1. The role of positive reinforcement and parental positivity in relation to CU traits and aggression

A review of the evidence regarding parenting and the link between CU traits and aggression provided some, but not consistent, support for a role for positive parenting in attenuating the association. This would be plausible for example if positive reinforcement provided a restraint on aggression in the absence of empathy. In view of the findings reported in Paper 2, I hypothesised that positive parenting might attenuate the effect of CU traits in the presence of aggression. This was in some ways a risky hypothesis because it implied a three-way interaction for which my sample size has limited power. However, it seemed an important idea to test, because of its potential clinical implications.

The findings reported in Paper 3 were broadly supportive of protective effects of positive reinforcement and maternal positivity, although interpretation had to be cautious in view of some non-significant findings. In relation to positive reinforcement, observed during a tidy-up task, there was a three-way interaction between CU traits, aggression and praise at age 3.5 years, and aggression at age 5 years. Examination of the figures representing the two-way interactions

indicated that, as predicted in the vulnerable high aggression group, in the presence of high praise there was a reduced association between CU traits and age 5 years aggression. However, in the low aggression group the associations were reversed and there was a stronger association between CU traits and later aggression in the high praise group. This was a puzzling finding I had not predicted. When the analysis was repeated with the 12-item ICU this interaction was greatly attenuated (interaction coefficient β= .22 reduced to β= .07), which suggests that it may have been mostly driven by the items that are less representative of CU traits, particularly in preschool children. The three-way interaction with maternal positivity was not significant. However, the pattern of findings was similar to that for praise, and also less puzzling. In the presence of high aggression, high positivity was associated with a much lower association between CU traits and later aggression compared to low positivity, and this was supported by a significant two-way interaction. In the presence of low aggression, the association between CU traits and later aggression was low across all levels of positivity. Taken together the findings provide moderately good support for a role for positive parenting in reducing the negative effect of CU traits among children already aggressive.

Based on the evidence of the synergistic effect of CU traits and aggression on later aggressive outcomes, we found evidence that observed parental positive reinforcement/praise and maternal positivity provides a restraint on aggressive behaviours in children with CU traits who have limited influence of empathy (Paper 3, Chapter 5). The modifying effect of positive parenting in the association between CU traits and later aggressive behaviour can be related to that positive parenting capitalises on the reward-dominant response style of individuals with CU traits and may promote the internalisation of prosocial norms (Clark & Frick, 2016; Reidy et al., 2017) in children with high CU traits who do not regulate aggression on the basis of empathy. These children may be able to reduce aggressive behaviours on the basis of reinforcement of prosocial behaviours encouraged by parental involvement. Again, this result supports that

parental reward-oriented response style (O'Brien & Frick, 1996) is relevant for reducing aggressive and other problematic outcomes in children with CU traits.

7.4.2. maternal positivity and praise in children exposed to community violence

Paper 4 (Chapter 6) also focused on the role of positive parenting, but in the association between environmental factors, particularly community violence, and future CU traits. This study is relevant as community violence is a common phenomenon observed in LMIC settings (Westbrook & Harden, 2010). Specifically, Colombia represents a particular context characterised by increased levels of violence among its communities due to a history of internal armed conflict (Ortega-Guerrero, 2018). Community violence exposure is thought to affect children's emotional and behavioural development (Lambert, Tache, Liu, Nylund-Gibson, & Ialongo, 2019) and constitutes an environmental risk factor for CU traits (Davis, Ammons, Dahl, & Kliewer, 2015; Kimonis, Frick, Munoz, & Aucoin, 2008). Early studies in Colombian involving children and adolescents showed that community violence exacerbates the risk for children's CPs (Chaux, Arboleda, & Rincón, 2012; Cuartas & Leventhal, 2020; Molano, Harker, & Cristancho, 2018), but there is no evidence of the link between violence among communities and CU traits.

In this study, we explored for the first time whether observed maternal positivity and praise (measured in the same way as for Paper 3) have a protective effect in the association between exposure to community violence and future CU traits in young children from a LMIC. In contrast to the findings from the cross-sectional paper (Chapter 3) and those previously reported in prospective studies with young children from HICs using observational measures of parenting (e.g., Waller, Shaw, & Hyde, 2017; Wright et al., 2018) we did not find main effects of positive parenting on later CU traits. Similarly, contrary to findings from Davis et al. (2015), exposure to community violence did not predict increased levels of CU traits as a main effect.

However, we found that children's exposure to community violence was associated with increased CU traits only in children with mothers showing reduced levels of positivity. This

interaction was still seen after accounting for baseline CU traits and for maternal mood to address possible reporting bias. These findings may indicate that for young children the effect of community violence depends substantially on how well protected they are by their parents. Results are consistent with studies indicating that positive parenting moderates the genetic risk for CU traits (Hyde et al., 2016; Waller et al., 2017) but contrary to Davis' study (2015) who did not find a moderating effect of parental report of positive parenting in the association between community violence and aggression in adolescents.

Conversely, and contrary to our hypothesis, observed maternal praise was not related to decreased CU traits, while maternal negativity was significantly associated with elevated CU traits as a direct effect. This result supports findings from HIC settings with young children that found significant associations between negative parenting and higher levels of CU traits (Centifanti, Meins, & Fernyhough, 2016; Hawes, Dadds, Frost, & Hasking, 2011; Mills-Koonce et al., 2016). Negative parenting and CU traits can be linked based on Kochanska and colleagues (1997, 2002) proposal stating that negative parenting may interfere with children's internalisation of social norms, as well as with the development of empathy and conscience, which in turn affects guilt and concern for others' distress development. As mentioned above, it is possible that parenting practices among Colombian parents, characterised by a proneness to use of punitive practices, have a strong effect on children CU traits scores over time.

The present study is relevant as it adds evidence concerning the protective role of positive parenting, not only for individual risk factors but also for more broadly ones such as community violence and its link to CU traits. This study is informative about how positive parenting reduces the risk for future antisocial outcomes in young children that are immersed in violent contexts in LMICs. The protective effect of warm and reciprocal parenting may be associated with previous literature informing the mechanism in which this dimension operates. Warm parenting fosters the development of children's conscience and prosocial emotions including empathy, guilt, and prosocial behaviours (Cornell & Frick, 2007; Kochanska, 1997) by

enhancing internalisation of social norms (Clark & Frick, 2016). The fact that the effect of maternal positivity was observed only in those children exposed to violent contexts may be explained by mothers' behaviours oriented to provide a positive context based on positive interactions with their children who may require more care and affect due to the aversive context in which the family is immersed.

7.5. Strengths and limitations

This study presents a number of strengths, including: 1) we recruited participants from three different Colombian regions, each one representing diverse geographic, socioeconomic and cultural characteristics. This increased the representativeness of the sample from a country with regions with diverse socio-economic conditions and meant that region could be included as a covariate in analyses. 2) The sample's economic status was similar to that reported for Colombia, also suggesting the sample was representative. 3) Participant retention from the baseline assessment to the follow-up assessment was 93%. I implemented diverse strategies to achieve this, such as giving incentives to families, providing booklets to inform general results of the baseline assessment, and keeping contact with the families to update contact information. 4) Study outcomes were assessed using established measures. This was the case for CU traits evaluated using the ICU and the CBCL previously used in studies with Colombian children. 5) We used observational as well as parent-report measures of parenting in prospective analyses, so that associations between parenting and parent-reported outcomes were not inflated by shared-method variance. 6) Parental mood at the time of reporting the outcome (CPs or CU traits) was included in the analyses as an approach to address the risk of reporting bias. 7) In Paper 2 we included data from two diverse settings, the UK and Colombia, which allowed cross-cultural replication of findings (Chapter 4).

Limitations of this study included: 1) the sample was not representative in terms of the educational level of the parents, which was higher compared to the national features. We addressed this limitation in Paper 4 (Chapter 6) by including sociodemographic confounds into

the analyses, including parental educational level. 2) Exposure to community violence was assessed using items devised by the researchers due to a lack of standardised measures of community violence exposure in young children. 3) The cross-sectional design in Paper 1 (Chapter 3) restricted the interpretation of the direction of the effects between variables so results must be interpreted with caution. However, we highlighted its relevance in terms of the evidence about distinctive mechanisms involved in CU traits compared to CPs. 4) Maternal depressive symptoms were included as a confounder in the analyses of the present study. Future research exploring the role of parenting dimensions on children's CU traits and CPs may include additional variables as possible confounders that were not assessed in this study and may better account for the findings (e.g., parental psychopathic traits, parental attributions or parental anxiety levels).

7.6. Theoretical and practical implications

Relevant implications of this thesis are associated with the possibility of conducting this study in a LMIC. This study was informative of the reliability and validity of measures that are extensively used in research examining CU traits and parenting mainly in HICs. Specifically, we found that the ICU short (12-item) and total scales (24-item), as well as the APQ three- and four-factor models, are valid measures for young children from a LMIC. This finding may promote the use of these measures in future research in samples with similar characteristics as those observed in Colombia.

We also found that, as in early studies of the role of parenting on CU traits in HICs, contributions of negative and positive parenting dimensions vary in function of the used measures to assess parenting dimensions (reported vs observed) and study design (cross-sectional vs prospective). In this study, we obtained different results regarding the direct association between positive parenting and CU traits in the cross-sectional paper in which we used a parent-reported measure (Paper 1, Chapter 3), compared to the prospective one in which we used observed measures (Paper 4, Chapter 6). One possibility is that mothers' perception

about the way they interact with their children (reported) differs from the behaviours they displayed during the play task (observed). Further assessments with this sample are needed to identify the stability of these associations over the time to provide more evidence regarding the role parenting dimensions on CU traits and the role of CU traits on CPs.

This study explored not only the generalisability of findings from HICs studies to a diverse cultural and social setting but also explored novel research questions in both HIC and LIMC. Since the *La Sabana Parent-Child Study* used parallel measures as those from the WCHADS study, we were able to contribute evidence of the synergistic effect of CPs and CU traits on future aggression in young children from the UK and Colombia. This finding indicates that underpinning mechanisms for aggressive behaviours are different from those mechanisms associated with CU traits as such CU traits do not have a potential risk in the absence of aggression. Tailored and early interventions must be prioritised in those children presenting both aggressive behaviours and CU traits, who are at a higher risk for future severe and chronic negative outcomes.

Additionally, we explore associations that have not been studied in young children either in HICs or LMICs, particularly about how positive parenting operates when families are exposed to a violent context. We used items to identify those participants who experienced violent and criminal acts associated with the internal armed conflict in Colombia. Although we did not find a direct association between community violence and CU traits, we identified that the protective effect of parental warmth on CU traits is activated when children are immersed in adverse contexts. Prevention strategies and early interventions to reduce the impact of community violence in those children who are exposed must include enhancing parent-child interactions based on affective and positive practices.

Implications of this study are also related to the sample's age. Most of the identified studies regarding CPs, CU traits and parenting include samples of school-age children and adolescents. However, the early identification of the origins of CPs and CU traits is relevant for

designing early and tailored interventions aimed to reduce the risk for antisocial outcomes in adolescence and adulthood. Overall, early intervention and prevention strategies must focus on enhancing positive based parent-child interactions and extinguish -or at least reduce- the use of parental punitive practices. Intervention strategies may also be directed towards children to increase skills to recognise and adequately respond to others' distress caused by their misbehaviour. Also, children can benefit from strategies to expand and maintain behavioural repertoires of prosocial behaviours.

7.7. Suggestions for future work

Further research examining the early origins of CPs and CU traits must include additional dimensions of parenting to identify which specific aspects are the most relevant across samples with diverse characteristics and in relation to diverse individual or environmental associated risk factors. Additional measures regarding CU traits and CPs, such as observational ones, will reduce the risk for common method variance due to the exclusive use of parental reports of children behaviours. Furthermore, future studies must examine which of the underpinning mechanisms and kinds of interpersonal sensitivity associated with CU traits that may exacerbate aggressive behaviours that are already established, as well as experimental approaches to examine the moment-by-moment responses of children’s increased aggression and CU traits to others’ distress. Finally, further studies exploring broader risk factors associated with CPs and antisocial behaviours, such as community violence or other environmental risk factors, must include valid and extensively used measures or available reports to identify those participants that are involved in particular conditions.

7.8. References

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