The Influence of Parenting on the Development of Callous-Unemotional Behaviors from Ages 2-9

A thesis submitted for the degree of

Doctor of Philosophy

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Declaration

I declare that this DPhil submission is my own work and does not contain materials previously published or written by another person. Contributions made to this research by others via the project’s conception, design, implementation, data collection, or other contributions are explicitly acknowledged in the thesis (see ‘Preface to Thesis and Contributors’).

Signed………………………………………………………………

Date……………………………………………..
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Acronyms, Abbreviations, and Symbols

α – Cronbach’s alpha

AB – Antisocial Behavior

APSD – Antisocial Process Screening Device

B – Unstandardized regression coefficient

B – Standardized regression coefficient

CD – Conduct Disorder

c.f. – compare (Lat. confer)

CFA – Confirmatory Factor Analysis

CFI – Comparative fit index

CI – Confidence intervals

CP – Conduct Problems

CU – Callous-Unemotional

d – Effect size

df – degrees of freedom

EFA – Exploratory Factor Analysis

e.g. – for example (Lat. Example gratia)

et al. – and others (Lat. Et alii, et alia, etc.)

etc. – and so on (Lat. et cetera)

FCU – Family Check-Up

FIML – Full-information maximum likelihood estimation

i.e. – that is to say (Lat. id est)

ICU – Inventory of Callous unemotional traits

M – Mean

n/N – Number
ns – non-significant

ODD – Oppositional Defiant Disorder

PCL – Psychopathy Checklist

\( p \) – p value (probability)

\( r \) – correlation coefficient

\( R^2 \) – squared correlation coefficient (coefficient of determination)

RMSEA – Root mean square error of approximation

\( SD \) – standard deviation

SES – socioeconomic status

SRMR - Standardized root mean square residual

\( t \) – t-value (statistic that follows t distribution)

TLI – Tucker Lewis index

WLSMV – Weighted least squares means and variance estimation

\( \chi^2 \) – Chi-Square value
Abstract

The purpose of this thesis was to examine associations between parenting and child callous-unemotional (CU) behavior in a high-risk sample of children aged 2-9 years. First, a narrative review examined the construct of CU behavior, focusing specifically on definitions and measurement of the affective and interpersonal dimensions of psychopathy, and their applicability to youth. Second, a systematic review examined evidence from 30 studies that had investigated associations between dimensions of parenting and CU traits. Studies were classified as testing one of five different research questions. Third, five different empirical studies tested various research questions pertaining to associations between parenting and CU behavior. Data from mother-child dyads ($N = 731; 49\%$ female) were collected from a multi-ethnic and high-risk sample, and included multi-method observed measures of parenting. Study 1 found that observed harsh and positive parenting predicted child CU behavior from ages 2-4, controlling for earlier child behavior and various demographic covariates. Study 2 employed a moderator design, and found that harsh and warm parenting were more strongly related to the conduct problems of children with high versus low levels of CU behavior. Study 3 tested cross-lagged simultaneous and reciprocal effects models, and found that parental warmth (observed and expressed by parents in speech samples) uniquely predicted child CU behavior versus conduct problems. Study 4 tested the factor structure of Inventory of Callous-Unemotional Traits (ICU; Frick, 2004), finding support for a three-Bifactor structure. Finally, Study 5 found that parent-child affective interactions at ages 2-3 predicted CU traits at age 9, over and above general behavior problems. Taken together, the results of this thesis suggest that CU features are more malleable than previously thought. In particular, aspects of parental affect and warm parenting behavior appear to be important key targets of investigation for future empirical and intervention studies.
Preface to Thesis and contributors

The following contributors are acknowledged and thanked for making this DPhil project possible:

First, this thesis uses data from the Early Steps multisite project: a large, ongoing randomized-controlled trial of the Family Check-up Intervention (Dishion et al., 2008). The conception, design, and implementation of this intervention and trial were overseen by the project’s four Principal Investigators (Thomas Dishion, Daniel S. Shaw, Frances Gardner, & Melvin N. Wilson). Ongoing intervention implementation and annual data collection is carried out by dedicated parenting therapists and research assistants at each of the three project sites.

Second, this thesis contains published work and work prepared for publication, some of which has been co-authored. The original contributions and contributions of other authors are detailed below:


The idea for the review was conceived by Waller following discussion with Gardner (Doctoral Supervisor). Through consultation with Gardner, Waller developed the aims, search strategy, and eligibility criteria. Writing of the review (i.e., writing the
introduction, running the search, extracting the data, summarizing the findings, and
writing the discussion) was done by Waller. Waller presented the findings of the review
to a departmental research group and their thoughtful feedback is acknowledged. In
addition, Sean Grant provided helpful comments on a first draft of the review. Gardner
and Hyde read drafts and provided comments and feedback on the paper ahead of initial
submission for publication, resubmission after revise and resubmit, and final submission
prior to acceptance. The thesis version of the review (Chapter 3) contains additional
references and background information about antisocial behavior in the introduction
(written by Waller). It also contains further discussion of how the findings of the review
might direct future empirical analyses that test associations between parenting, CU
traits, and conduct problems (written by Waller). These subsequent empirical analyses
are found later in the thesis.

b) The measure of parental affective attitudes used in this thesis, and described in
Chapter 4 (Methods) was validated in a published paper: Waller, R., Gardner, F.,
of parental affective attitudes in high-risk preschoolers. *Journal of Abnormal
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The significant assistance of others in the project’s design and in the collection of data,
which was used in this publication and in the version included in this thesis, is
acknowledged (Early Steps Multisite Trial). For the published version of this paper,
Waller developed the analytic strategy and study aims following consultation with
Gardner (Doctoral Supervisor). Waller wrote all parts of the manuscript and carried out
all the analysis. Other coauthors read, commented on, and edited the manuscript of the
paper at various points ahead of its publication (ahead of submission, following revise and resubmit, and ahead of acceptance).


The significant assistance of others in the project’s design and in the collection of data, which was used in this publication and in the version included in this thesis, is acknowledged (Early Steps Multisite Trial). For the published version of this paper, Waller developed the analytic strategy and study aims following consultation and discussion with Gardner. Waller wrote all parts of the manuscript and carried out all the analysis, although Hyde had previously developed the measure of deceitful-callous behavior used in the published version of the paper (Hyde et al., 2013). However, for the thesis version of the paper, Waller derived a different measure of callous unemotional behavior, which used somewhat different items.

Prior to submission of the paper for publication, Waller presented the results of the analyses at two separate research meetings with the whole Early Steps project research team, and received verbal feedback on the study. All coauthors read and commented on drafts of the published manuscript ahead of publication, ahead of resubmission, and following acceptance. Some differences in analytic strategy (developed by Waller solely) distinguish the thesis version of the paper from the published version.
d) A version of Study 2 has been submitted for publication: Waller, R., Gardner, F., Shaw, D. S., Dishion, T. J. and Wilson, M. N. (2013). Do deceitful-callous behaviors moderate the association between parental warmth and harshness and the conduct problems of high-risk preschoolers? *Manuscript under review.*

The significant assistance of others in the project’s design and in the collection of data, which was used in this publication and in the version included in this thesis, is acknowledged (see Early Steps Multisite Trial). For the submitted version of this paper, Waller developed the analytic strategy and study aims following consultation and discussion with Gardner (Doctoral Supervisor), which followed careful evaluation of the findings of the systematic review (Chapter 3 of thesis, published paper as outlined in the previous section). Waller wrote all parts of the manuscript and carried out all the analysis, although Hyde had previously developed the measure of deceitful-callous behavior used in the published version of the paper (Hyde et al., 2013). However, in the thesis version of the paper, Waller derived a different measure of callous unemotional behavior, which used somewhat different items. All coauthors read and commented on drafts of the published manuscript ahead of submission for publication.

e) A version of Study 3 has been submitted for publication: Waller, R., Gardner, F., Viding, E., Shaw, D.S., Dishion, T.J. and Wilson, M.N. (2013), Bidirectional associations between parental warmth, deceitful-callous behavior and conduct problems in high-risk preschoolers. *Manuscript under review.*

The significant assistance of others in the project’s design and in the collection of data, which was used in this publication and in the version included in this thesis, is acknowledged (Early Steps Multisite Trial). For the submitted version of this paper,
Waller developed the analytic strategy and study aims following discussion and meeting with both Gardner (Doctoral Supervisor) and Viding (Professor Essi Viding; collaborator from University College London). Waller wrote all parts of the manuscript and carried out all the analyses, although Hyde had previously developed the measure of deceitful-callous behavior used in the published version of the paper (Hyde et al., 2013). However, for the thesis version of the paper, Waller derived a different measure of callous unemotional behavior, which used somewhat different items. All coauthors read and commented on drafts of the published manuscript ahead of submission for publication, which led to some minor changes to parts of the introduction and discussion.


The research question addressed in this paper is not included in the current thesis. However, the measure that is validated within the paper is included in the Methods and Results sections. As such, the significant assistance of others in the project’s design and in the collection of data, which was used in the development of the measure, is acknowledged (Early Steps Multisite Trial). The rationale and aims of the study were developed through meetings and presentations of the whole Early Steps team. Waller worked in conjunction with Winter and Sitnick, and other Early Steps colleagues based in the US, to identify items to be included in subscales across the three observational
methods. Waller solely carried out the analysis to support combining the three measures in a multi-method latent construct (see Section 4.4.2). Waller carried out the validation analysis, wrote the introduction, methods, results, and discussion for the paper (not included in thesis).

**g) Study 4: Factor structure of the Inventory of Callous-unemotional traits at age 9**

The significant assistance of others in the project’s design and in the collection of data, which was used in this publication and in the version included in this thesis, is acknowledged (Early Steps Multisite Trial). Waller solely developed the analytic strategy and aims of Study 4. Waller wrote all parts of Study 4 and carried out all the analysis.

**h) Study 5: The influence of early child behavior and parenting on age 9 callous-unemotional traits among high-risk children**

The significant assistance of others in the project’s design and in the collection of data, which was used in this publication and in the version included in this thesis, is acknowledged (Early Steps Multisite trial). Waller solely developed the analytic strategy and aims of Study 5 (which incorporate models from Studies 3 and 4). Waller sent the theorized model for Study 5 to an expert in the field for feedback (Dr. Luna Muñoz, Department of Psychology, University of Durham, UK; personal communication, January 2013). No changes were made to the model following feedback, but the support of Dr. Muñoz is gratefully acknowledged. Waller wrote all sections of Study 5 and solely carried out all the analysis.
Chapter 1: Introduction
1.1. Background

1.1.1. Antisocial Behavior and psychopathy

Antisocial behavior represents a significant cost to society. Early-starting, lifetime persistent forms of antisocial behavior are especially costly, requiring education, treatment, or even incarceration of delinquent children or adolescents (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Scott, Knapp, Henderson, & Maughan, 2001). Aside from the financial cost, antisocial behavior is associated with an emotional cost to victims, families, and communities. Furthermore, children with early-starting behavior problems and increasingly entrenched and chronic forms of antisocial behavior are at risk of developing a wide range of other adverse mental health problems in adulthood (Fergusson, Horwood, Ridder, & Beautrais, 2005; Odgers et al., 2008). As such, significant effort has focused on combating early-starting conduct problems and treating juvenile offenders and at-risk youth. However, intervention and treatment effectiveness is limited by the fact that children and adolescents with antisocial behavior do not comprise a homogenous group (Frick & Marsee, 2006; Frick & Dickens, 2006; Moffitt, 1993; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Pardini & Frick, 2013). Specifically, it appears that certain subgroups of antisocial youth differ in the cause, course, and severity of their delinquency and aggression, potentially requiring different treatment or intervention approaches.

One approach to reduce heterogeneity among antisocial youth has focused on extending the adult construct of psychopathy to children and adolescents. Psychopathy is a personality disorder, characterized by shallowness of emotion, callousness, impulsivity, deceitfulness, arrogance, a manipulative interpersonal style, thrill-seeking behavior, and the ability to cause harm and distress to others without guilt or remorse.
Psychopathic traits among adult criminal samples have a prevalence of 15-30% (Salekin, Neumann, Leistico, & Zalot, 2004) and are associated with more severe and violent aggression, higher rates of reoffending, and poorer treatment outcomes (Gretton, McBride, Hare, O’Shaughnessy, & Kumka, 2001; Hare, 1996, 1999). Similarly, among youth samples, the presence of psychopathic traits appears to designate a subgroup that shows a more severe, stable, and aggressive pattern of antisocial behavior.

More specifically, the downward extension of psychopathy to youth has been dominated by a focus on the interpersonal (e.g., deceitfulness, and manipulativeness) and affective (e.g., shallow affect and lack of guilt) dimensions, which have been most commonly been labeled as Callous-Unemotional (CU) traits (Frick, 2004; Frick, O’Brien, Wootton, & McBurnett, 1994). This focus is supported by research, which suggests CU traits that designate a particularly high-risk group of antisocial youth. For example, CU traits are associated with earlier onset of conduct problems (Christian, Frick, Hill, Tyler, & Frazer, 1997) and particularly severe patterns of antisocial behavior (see Frick & White, 2008). Experimental data also suggest that youth with high levels of CU traits show a neurocognitive and socioemotional profile similar to adult psychopaths, including reduced responsivity to the distress of others (Blair, Colledge, Murray, & Mitchell, 2001a) and insensitivity to punishment (Blair, Colledge, & Mitchell, 2001b). CU traits also demonstrate high heritability (Viding, Blair, Moffitt, & Plomin, 2005), are associated with differences in neural reactivity (e.g., Marsh et al., 2008), and appear moderately stable (e.g., Dadds, Fraser, Frost, & Hawes, 2005; Obradovic, Pardini, Long, & Loeber, 2007). In conceptualizing psychopathy among youth, research has focused on trying to understand its origins, how it can be measured, and testing whether the presence or absence of psychopathic traits among antisocial
youth represents unique etiological processes (Kotler & McMahon, 2005; Frick & Viding, 2009; see Chapter 2).

1.1.2. Parenting and callous-unemotional traits

A better understanding of the risk processes associated with antisocial behavior in the presence of callous-unemotional traits is vital in order to improve the effectiveness of interventions. In particular, patterns of poor parenting are a well-recognized risk process for the development of youth antisocial behavior. Research has consistently highlighted the importance of particular aspects of parenting to the development of child behavior problems, including rejecting parenting practices (Shaw, Gilliom, Ingoldsby, & Nagin, 2003), coercive patterns of parent-child interaction (Patterson, 1982) and positive parent-child engagement (Gardner, Ward, Burton, & Wilson, 2003). Furthermore, such research has been the empirical basis on which many successful parenting interventions have been predicated (see Chapter 3). Indeed, interventions targeting parenting practices have received strong empirical support (Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009).

However, a key research question is whether parenting, known to be a risk factor for the development antisocial behavior in general, is of similar importance among youth with emerging or existing CU traits. Second, while there are many investigations into the effectiveness of parenting-focused intervention programs for antisocial behavior in general, less is known about prevention and treatment, when youth also show a lack of empathy and affect (Frick, 2001). The development of parenting interventions specifically to target the psychopathic traits of antisocial youth would be significant in the face of a research tradition that has historically viewed both psychopathic adults and adolescents with therapeutic nihilism (Cleckley, 1941/1976; Salekin, 2002).
On one hand, it has been hypothesized that early manifestations of psychopathic or CU traits among children may generally affect how responsive they are to parenting, meaning that parent-focused interventions may be less efficacious. This assumption is in line with the notion that children with CU traits are less susceptible to socialization and discipline efforts of their parents (e.g., Oxford, Cavell, & Hughes, 2003). Specifically, CU traits are hypothesized to produce an attenuated response to punishment cues, disrupting moral socialization and internalization of parental norms, and preventing the distress of others being experienced as aversive. Failure to make these associations may undermine the development of empathy and increases the likelihood of aggressive behavior.

On the other hand, there is evidence that harsh parenting and low levels of parental warmth are related to increased levels of CU traits (e.g., Frick, Kimonis, Dandreaux, & Farell, 2003a; Pardini, Lochman, & Powell, 2007). Harsh punishment is hypothesized to elicit high levels of arousal, making it difficult for children to internalize parental messages about prosocial behavior, which over time produces increased callousness (Pardini et al., 2007). Indeed, if children learn social behaviors through observation, parents who demonstrate abusive, unemotional or unduly harsh behavior, or who themselves have difficulty communicating their feelings, may leave children unable to understand the perspectives or emotional demonstrations of others (Daversa, 2010), putting them at greater risk of developing psychopathic tendencies. At the same time, parental warmth and responsiveness may work against the development of antisocial behavior by promoting increases in empathy, guilt, and the internalization of prosocial behaviors, particularly in children with fearless temperaments (Kochanska, 1997). However, the lack of clarity about whether specific dimensions of parenting are related to increases or decreases in CU traits, and by extension, what any association is with the development of antisocial behavior, is unhelpful. In particular, there remains
clinical pessimism surrounding the treatment of antisocial or conduct-disordered children with high levels of CU traits, when the evidence about their responsiveness to parenting practices or behavior remains mixed and unclear at best. However, developing a precise understanding of the relationship between parenting, CU traits, and antisocial behavior among samples of children and adolescents has been hampered by studies testing markedly different research questions via different designs, in varying samples, and using a range of assessment methods.

This thesis therefore adopts various methodologies to examine associations between parenting, CU traits, and antisocial behavior, and seeks to move the literature forward in a number of ways. First, there has been no systematic review examining associations between different dimensions of parenting, CU traits, and antisocial behavior. The current thesis includes a systematic review (see Chapter 3) that synthesizes the results of studies that have investigated associations between parenting, CU traits, and antisocial behavior using a variety of study designs. Specifically, the systematic review included in this thesis attempts to move the current literature forward by addressing several questions, including whether parenting is related to the development of CU traits, the association between parenting and antisocial behavior at high versus low levels of CU traits, whether parenting-focused interventions for antisocial behavior are effective for youth with CU traits, and whether there are developmental differences in the extent or type of associations between parenting, CU traits, and antisocial behavior. The systematic review also provides a useful framework to guide the research questions and study designs for subsequent empirical analyses included in the thesis.

Second, this thesis seeks to address the fact that there have been very few longitudinal prospective investigations of associations between very early parenting and CU traits. Specifically, no studies have yet assessed the prospective, longitudinal effect
of very early parenting on the emergence of CU-like behaviors in very young children or how this relates to the development of conduct problems.

Third, throughout the empirical analyses making up this thesis, a prospective and longitudinal design is adopted. This type of design enables a number of research questions pertaining to associations between parenting, CU traits, and conduct problems to be addressed. It is unclear whether CU behavior measured in the toddler years has similar developmental meaning in middle-childhood, or if these behaviors show persistence and stability over time. This thesis addresses this question by directly testing associations between CU behavior measured during toddlerhood and CU traits measured during middle childhood (age 9). Further, an early-starting prospective design enables a range of child-driven versus parental risk factors to be tested, which could inform models of antisocial behavior development. More specifically, the different ages at which assessment of both CU traits and parenting occurs in the current thesis enables associations between parenting and CU traits to be tested during specific developmental periods and the differential prediction of CU traits and conduct problems by several dimensions of parenting evaluated. Finally, the young age of the sample is important given the greater potential for malleability of behavior at younger ages, when prevention or intervention possibilities may be stronger.

Fourth, the thesis moves the current literature forward in relation to the measurement of parenting. Studies that have assessed different associations between parenting and CU traits in children have tended to rely on parent reports of parenting behavior. Parent-reported parenting, while relatively inexpensive, is subject to the typical threats to validity associated with self-report methods (see next section). This thesis uniquely addresses the question of how parenting is associated with CU traits and conduct problems using a range of different measurement approaches, including multi-informant observed measures of parenting behavior, measures of parental affect coded
from speech samples, and parent-reported measures of parenting. Further, it has been argued that parenting needs to be contextualized within the complex interplay of responses, behaviors and prior interactions or experiences shared by parent and child (Belsky, 1984). Some measures relying solely on parent reports or observations of parenting, which tend to focus on active and goal-directed parent behavior, may risk ignoring information relating to relational and affective factors. Indeed, it has been argued that positive affective dimensions of parenting may be particularly pertinent in relation to the development of CU traits in children, who display a unique pattern of socioemotional and cognitive characteristics (see Chapters 2 and 3). As such, the latter studies in this thesis focus specifically on assessing the prediction of CU traits by various measures of positive parental affect.

1.2. **Current thesis**

Across Chapters 2-5 and the individual empirical studies (Studies 1-5), this thesis therefore adds to and moves the current literature forward regarding associations between dimensions of parenting, CU traits, and conduct problems in a number of ways:

1.2.1. **Chapter 2: Conceptualizations and measurement of psychopathy across development and its extension to very young children**

Chapter 2 of this thesis is an extensive background chapter that critically evaluates the extension of the construct of psychopathy and its application to youth samples, including to very young, pre-school children. Very few studies have yet to extend the construct of psychopathy to very young samples, which is surprising for a number of reasons. First, it is surprising because childhood problem behavior has its developmental roots in the preschool years (Shaw et al., 2003). Second, high rates of
disruptive behavior during the preschool period are associated with harsh, inconsistent, and dysfunctional parenting practices (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008). Third, while many of the behaviors related to CU traits require relatively advanced cognitive skills, there is developmental evidence to support extending the construct of CU traits to preschool children. For example, the results of studies investigating conceptually related behaviors to those assessed by measures of CU traits, including empathy (Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008), prosocial behavior (Svetlova, Nichols, & Brownell, 2011) and guilt (Kochanska, Gross, Lin, & Nichols, 2002), suggest that these skills mature rapidly from ages 2 to 5, and may be influenced by early parenting (e.g., Kochanska, 1997). The toddler years may therefore be a particularly useful focus for investigating the emergence of CU behavior.

Thus, there is evidence from developmental psychology literature to support the extension of the construct of CU traits to preschool children, as developmental substrates relating to key affective, behavioral and personality characteristics appear to be in place by around 3 years old (e.g., Bussey, 1992; Kochanska et al., 2002). Nevertheless, ongoing debates in the adult psychopathy literature relate to the role of antisocial behavior in conceptualizations of psychopathy. Likewise, in the youth literature, it remains unclear how the early emergence of psychopathic traits relates to the development of conduct problems. Chapter 2 therefore also seeks to critically examine theoretical and measurement issues in both the adult and youth literature surrounding the distinction between antisocial behavior and psychopathy.

Further, while there is strong evidence to support an association between parenting and conduct problem development among youth, it is less clear how parenting relates to youth conduct problems when children also have high levels of CU traits. In particular, it is unclear whether the association found in some studies between parenting and CU traits is simply an index of the non-specific effect of parenting on conduct
problems in general (i.e., parenting itself does not have a specific effect on CU traits). In contrast, it may be that certain aspects of parenting are uniquely related to CU traits, which in turn, drives the development of increasingly antisocial behavior among youth. Thus, models of antisocial behavior development that consider reciprocal, longitudinal associations between different variables may have significant utility. Indeed, across all models tested in the empirical studies included in the thesis the effects of including a variety of different indices of antisocial behavior are tested.

In sum, to understand associations between parenting, CU traits and conduct problems, a clear conceptualization of early psychopathic-like behaviors among youth, and how this might differ from antisocial behavior, is needed. Chapter 2 therefore seeks to critically evaluate literature that has examined, (1) historical and modern conceptualizations of psychopathy among adults, including ongoing debates about its separation from definitions of antisocial behavior; (2) different approaches to subtyping antisocial behavior among youth; (3) the definition and measurement of CU traits among different samples of youth (and, as in adult samples, how this should/does differ from definitions of youth antisocial behavior); (4) the extension of CU traits to even younger samples of children, and overlap with literature examining neurobiological systems underpinning antisocial behavior development.

1.2.2. Chapter 3: What are the associations between parenting, callous-unemotional traits, and antisocial behavior in youth? A systematic review of evidence

Chapter 3 is a systematic review examining evidence from studies that have investigated various relationships between parenting, CU traits, and antisocial behavior. Studies were categorized according to five distinct research questions each addressing
associations among parenting, CU traits and antisocial behavior in a different way. The results from Chapter 3 suggest that dimensions of parenting are prospectively related to changes in CU traits. Subgroups of youth with both high levels of CU traits and antisocial behavior also appear to have experienced more negative parenting practices. However, negative parenting is not consistently related to antisocial behavior in cross-sectional studies for youth with high levels of CU traits. At the same time, parenting-focused interventions appear effective in reducing the level of both antisocial behavior and CU traits in youth. The findings are critically discussed as they have important implications for current etiological theories of antisocial behavior and treatment approaches.

Furthermore, the analytic strategy and measurement approach within the empirical studies making up the rest of this thesis are guided by included studies examined in the systematic review of Chapter 3. This thesis adopts three different study designs identified in Chapter 3. Specifically, Studies 1-3 of this thesis address a different question about longitudinal and cross-sectional associations between parenting, antisocial behavior and CU traits. Further, Study 5 involves a novel study design addressing a research question relating to the prediction of CU traits in middle childhood that no previous studies have adopted.

1.2.3. Chapter 4: Methods

Chapter 4 is the methods chapter. First, Chapter 4 includes a specific rationale for each of the empirical analyses making up the thesis (Studies 1-5). Second, Chapter 4 provides detailed description of the project that the data are from. Participants for this thesis are 731 low-income mothers and children at high risk for conduct problems, recruited as part of the Early Steps Multisite trial of the Family Check-Up (FCU)
parenting intervention (Dishion et al., 2008). Details of the recruitment, screening, and randomization of families to the FCU are provided in Section 4.2. Further, detailed description of the intervention and characteristics of families included in the study is provided in the Methods (Section 4.2) and Results (Section 5.1.1) chapters.

Third, Chapter 4 outlines the measures used in the studies that make up the rest of the thesis (Studies 1-5; see below). The measures include a range of different methods for assessing parenting. Some measures already existed as part of the Early Steps Multisite trial measurement framework, including a multi-informant observational measure of harsh parenting behavior and parent-reported measures of parental harshness. In addition, Chapter 4 provides a description of the measures specifically derived for the thesis. Specifically, the current thesis sought to build on a significant body of literature has examined the influence of parenting on children’s development (e.g., Baumrind, 1975; Bornstein, 2002; Bruner, 1977; Patterson, 1982; Pettit et al., 1997). This literature is diverse in terms of the theoretical framework in which parenting is conceptualized. More specifically the current thesis sought to examine the association between key dimensions of parenting and child CU traits. The voluminous literature linking parenting practices to child outcomes features a plethora of dimensions that are assessed as part of the construct of parenting. A measure of harsh parenting already existed within the Early Steps framework (see Section 4.3.6). However, a measure of positive parenting was newly derived for this thesis and its prediction of child CU behavior assessed in Studies 1 and 5.

‘Positive parenting’ is invariably used as an umbrella term to refer to a range of behaviors, including warmth and sensitivity, proactive structuring of the environment, effective limit-setting, and contingency-based reinforcing responses. Conceptualizations of positive parenting arose from Baumrind’s (1975) constructs of authoritative, authoritarian, and permissive parenting (Maccoby & Martin, 1983). Two dimensions of
Authoritative parenting, specifically warmth and structure, have been incorporated into many parent-focused interventions. Authoritative parents create a supportive, stable, and structured environment for their child (i.e., provide firm and consistent behavioral control), while simultaneously being warm and affectionate (i.e., responsive, engaged and involved). Positive parenting strategies include scaffolding, (e.g., breaking behavior into small), contingent positive reinforcement (e.g., use of praise), monitoring (e.g., supervising young children’s activities), and positive involvement (e.g., providing youngsters with positive affection) (Dishion et al., 2008; Forgatch, Bullock, & Patterson, 2004; Patterson, 1982; Patterson, Reid, & Dishion, 1992; Snyder & Stoolmiller, 2002). Numerous randomized trials of parenting-focused interventions and mediation analyses within randomized trials, where increases in positive parenting are associated with reductions in child conduct problems, attest to the potential causal influence of these parenting strategies for child outcomes (Dishion et al., 2008; Gardner, Burton, & Klimes, 2006; Gardner, Hutchings, Bywater, & Whitaker, 2010; Furlong et al., 2012).

Within this context, two key methodological limitations have undermined the validity of measures adopted by previous studies, which the current thesis sought to address. First, many previous studies are limited by use of parental self-report data to assess parenting and in some cases, child outcomes. Various methodological concerns surround these techniques (Gardner, 2000; Morsbach & Prinz, 2006), which center on well-known threats to validity associated with self-report methods, including social desirability effects, but also on specific difficulties relating to assessing parenting (Holden, 2001; Krevans & Gibbs, 1996). For example, parents may have difficulties interpreting the meaning of items relating to parenting constructs (e.g., time-out or proactiveness) or in making judgments about behaviors over significant time periods (e.g., positive engagement over a month, or a year) (Morsbach & Prinz, 2006). These
difficulties may be exacerbated when parents have also participated in parenting intervention. In addition, when parents report on child outcomes and parenting, a further (though related) limitation arises whereby shared method variance is responsible for inflating reported associations. Finally, while single-informant observation of parenting is a strong alternative or complement to parent-reports of parenting, such methods are not immune from threats to validity, including observer reactivity or inadequate behavior sampling (Gardner, 2000; Stoolmiller, Eddy, & Reid, 1999).

Therefore, the current thesis sought to test a multi-method observed measure of positive parenting (see Section 4.4.2). The measure of observed positive parenting captures parents’ proactive establishing of structures or activities to encourage positive child behavior, their provision of warmth and sensitivity to children’s emotional experience, and their contingent rewarding of positive child behavior (Crone, Horner, & Hawken, 2003; Dishion et al., 2008; Dunlap & Fox, 2009; Gardner et al., 2003). In developing the measure, the current thesis sought to address some of the methodological limitations of previous studies outlined above, including social desirability, observer reactivity, and method overlap. The current thesis was able to take advantage of ratings from three different approaches to observing parent behavior, including micro-social analysis and macro-social ratings of videotaped parent-child interactions during structured tasks in the home, and global ratings of unstructured parent-child interactions following a ‘live’ home visit of 2-3 hours by a different assessor.

At the same time, the systematic review (see Chapter 3) suggested that positive affective aspects of parenting, in particular warmth and positive parent-child interactions, may represent a unique risk factor for the development of CU traits. As such, in subsequent studies included in the thesis, observed and expressed dimensions of parental warmth are a focus of empirical analyses. In general, it has been theorized that both parent and child experience a close and mutually warm relationship process as
pleasurable, such that positive affect become positively reinforcing (see MacDonald, 1992). For example, if an infant does not experience consistent warmth, responsiveness, and positive affective displays from a parent, their infant’s own positive emotional responsiveness to the parent may also decrease and they may be at risk of developing low emotional responsivity, callousness, and uncaring (i.e., CU traits) (Hawes et al., 2011; Pardini et al., 2011). It theoretically intuitive however, that if a parent, who may be genetically predisposed to be low in warmth/positive affect, finds attempts at warmth are not reciprocated, the frequency of their displays of warmth will decrease (Hawes et al., 2011; Pasalich et al., 2011). In order to test substantive questions relating to the nature and type of associations between low parental warmth and child CU traits with the thesis, however, specific measures of warmth were needed.

First, items that only assessed warmth taken from the same global measure of observed positive parenting developed for Study 1 were isolated to index parental warmth and positive emotional interactions between parent and child. The advantage of this measure was that the assessor spent at least two hours in the family home, witnessing both structured tasks and unstructured interactions. The ratings therefore provide a global and holistic snapshot of the emotional climate of the family (see Section 4.4.4). Second, a newly derived measure of positive affective attitudes was tested within the thesis. The measure of positive parental affective attitudes represents the first time that this measure has been validated in parents of very young children (see Waller et al., 2012a; Section 4.4.3) and builds on a large literature that has previously assessed parental expressed emotion (e.g., Magana et al., 1986; Vaughn & Leff, 1978). Affective attitudes are conceptualized as the representations a parent holds about their child, their relationship, and their interactions. Positive affective attitudes are hypothesized to be informative about early psychopathic outcomes because they appear to tap into broader cognitive and socioemotional aspects of parenting, which may be
particularly important in relation to the unique profile of cognitive and socioemotional deficits, exhibited by children with high levels of CU traits.

As well as parenting measures, this thesis also derived new measures of child behavior, including a measure of CU behavior, which incorporated items from two child behavior questionnaires using Exploratory and Confirmatory Factor Analyses. The usefulness of the CU behavior in predicting externalizing behavior over and above auto-regressive effects is also tested. In addition, the Early Steps measurement framework includes a measure of CU traits given to parents to complete at age 9 (the Inventory of Callous-Unemotional traits; Frick, 2004). Chapter 4 outlines the details of this measure and the analytic strategy to test its factor structure and reliability in this high-risk community sample (Study 4).

Finally, Chapter 4 outlines the analytic strategy for each empirical study (Studies 1-5) included in the thesis, including the statistical techniques adopted. Each model is explained and summarized diagrammatically, to make explicit the associations being tested (i.e., independent and dependent variables) and the covariates included in analyses. The systematic review of Chapter 3 enabled identification of a number of different designs to test causal associations between parenting and child outcomes. Indeed, prospective longitudinal studies represent a useful methodology for assessing correlations between parenting and child behavior over time. Further, the ability of the studies in the current thesis to control for earlier child behavior enables stronger conclusions to be drawn about the effect of parenting on child outcomes. Finally, the cross-lagged panel models tested in Studies 3 and 5 enabled examination of bidirectional effects between parent and child behavior.

Indeed, it is important to recognize that parents are both the providers of the early social environment and the source a child’s genetic information, both of which could put them at risk for criminal, antisocial, or psychopathic tendencies. Previous
studies have found high heritability estimates for the conduct problems of children with psychopathic traits (e.g., Viding et al., 2005; 2008). However, while genetic factors are important, they are unlikely to account fully for the associations between the antisocial or psychopathic behavior of parents and those of their offspring. For example, results from the Swedish Adoption Study (Bohman, 1996), highlight the interaction between biological and environmental factors. Adoptees whose biological parents were not antisocial and who were reared in low-risk families had a risk of adult criminality of 3% whereas for those raised in the presence of a high-risk family, the risk increased to 6%. For adoptees whose biological parents were antisocial or criminal, and who were adopted into low risk families, rates of adult criminality were 12%, but in the presence of both biological and environmental risk, the rate jumped to 40%. As such, an understanding of the early environment provided by parents (even if that environment is affected by the child or explained by shared genetic factors) is vital to inform intervention. The prospective longitudinal design adopted by the empirical studies within this thesis therefore represent one method by which correlations due to shared genetics and shared environment (and their interaction) can be tested. The results of the thesis should, however, be considered alongside studies adopting alternative approaches to examine bidirectional associations between parent and child behavior (see Chapter 6, Section 6.7).

1.2.4. Chapter 5: Results

Chapter 5 presents the results from the empirical studies included in this thesis. Studies 1-5 are as follows: Study 1, ‘Do positive and harsh parenting predict callous unemotional behaviors in preschool children?’ Study 2, ‘Do callous-unemotional behaviors moderate the association between parental warmth and harshness and the conduct problems of high-risk preschoolers?’ Study 3, bidirectional associations

1.2.5. Chapter 6: Discussion

Chapter 6 draws together the empirical findings from Studies 1-5 and integrates these findings with the conclusions from Chapters 2 and 3. In doing so, the discussion outlines conclusions that can be drawn about associations between parenting, CU traits, and conduct problems. Specifically, the discussion provides, (1) an overview of the main study questions, (2) A summary of the main findings of Studies 1-5, (3) an attempt to integrate and evaluation the findings of Studies 1-5 in relation to the conclusions of Chapters 2 and 3, (4) an outline of the strengths and limitations of the thesis, and, (5) future directions and implications for models of antisocial behavior, and intervention and prevention possibilities.
Chapter 2: Conceptualization and measurement of psychopathy across development and its extension to very young children
2.1. Overview

Psychopathy refers to a constellation of personality traits and characteristics that have been recognized throughout history. Features similar to those used in modern definitions of psychopathy can be found at various points in the Bible, including, ‘...he has said in his heart, I shall not be moved for I shall never be in adversity. His mouth is full of cursing and deceit and fraud: under his tongue is mischief and vanity’ (Psalm 10:5-7; King James VI version) and ‘...haughty eyes and a lying tongue and hands that shed innocent blood...a heart that devises wicked plans, feet that hurry to run to evil...a lying witness who testifies falsely and one who sows discord in the family’ (Book of Proverbs 6:17–19). In different cultures, psychopathy has also traditionally been distinguished from other forms of psychopathology. Characteristics including pride, manipulation, and extreme violence have been identified in Icelandic Sagas (Cooke, Michie, & Hart, 2006) and Greek Mythology (Murphy, 1976). The Yupic-speaking Eskimos in Alaska use the term ‘kunlangeta’ to refer to an individual who, ‘...lies and cheats and steals things and does not go hunting and... someone who does not pay attention to reprimands’ (Murphy, 1976; p. 1026).

In modern conceptualizations, psychopathy is defined as a complex syndrome comprising extreme interpersonal, affective, and lifestyle traits. Highly psychopathic individuals are recognizable through displays of shallow emotion, callousness, impulsivity, deceitfulness, thrill-seeking behavior, and cause harm to others without guilt (Cleckley, 1941/1976; Hare, 1991; Hare & Neumann, 2005; Lilienfeld & Widows, 2005; Poythress et al., 2006). Psychopaths typically ignore legal, moral, and social standards of conduct for short-term gain. In addition, while the actions of a psychopath are often callous and violent, their outward appearance is one of charm or glibness, enabling them to manipulate and deceive others to get what they want. Psychopaths
have thus been described as ‘*intra-species predators*’ who ‘*cold-bloodedly take what they want and do as they please, violating social norms and expectations without the slightest sense of guilt or regret*’ (Hare, 1996, p.25). Among adult criminals, high levels of psychopathic traits have a prevalence of 15-30% (Salekin, et al., 2004) and are associated with more aggressive and violent behavior, higher rates of reoffending, and poorer treatment outcomes (Gretton et al., 2001; Hare, 1996; Ogloff, Wong, & Greenwood, 1990).

In the last decade, there has been increased focus on the development of psychopathy, leading to renewed attention being paid to its classification and measurement, and its theoretical and empirical applicability to youth (Kotler & McMahon, 2005; Salekin, Leistico, Trobst, Schrum, & Lochman, 2005). Early identification of psychopathy would help improve understanding of its etiology, and may identify youth at risk of chronic offending at a time when psychopathic features and personality structure are likely to be more amenable to intervention (Salekin & Lynam, 2010). Classification of psychopathy among youth samples, and particularly very young children however, is not without controversy. One set of concerns focus on stigmatization associated with the word ‘psychopath’, implications for its use in legal settings, or potential triggering of iatrogenic factors (Seagrave & Grisson, 2002). A second set of concerns center on the malleability and lack of stability in personality during development, and whether the construct of psychopathy has meaning or validity in young children. First, Chapter 2 provides an overview of the development of the adult psychopathy construct, including discussion of modern conceptualizations and issues surrounding its measurement. Second, Chapter 2 discusses conceptualizations of psychopathy in youth research investigating its development, and the construct of callous-unemotional traits among children and adolescents. Finally, Chapter 2 evaluates the extension of callous-unemotional traits to preschool samples of children.
2.2. Historical conceptualizations of psychopathy in adults

2.2.1. Early descriptions

Case studies and clinical descriptions of psychopathy date back to the early 19th century. The earliest accounts focused on the violent and antisocial nature of psychopathic individuals. For example, Pinel (1806/1962) described the impulsivity and explosive aggression of psychopaths, highlighting ‘abstract and sanguinary fury’ as a key clinical feature, but also referring to psychopathy as ‘manie sans delire’ ['moral insanity’ or ‘madness without delusions’]. Partridge (1930) also emphasized angry aggression, emotional dysregulation, and volatility. While it is likely that such conceptualizations fit better with modern descriptions of highly externalizing and aggressive individuals (Patrick & Bernat, 2009), these early definitions demonstrate recognition of a severe subtype of antisocial behavior. Other early accounts focused on interpersonal and affective aspects of psychopathy. For example, ‘swindlers’ (Kraepelin, 1904/1915) and ‘self-seeking types’, (Schneider, 1934) were described as being identifiable through pleasant demeanors, which masked deceitfulness, superficial emotionality and lack of morality. Finally, historical accounts alluded to the tendency of psychopaths to show extreme cruelty (Rush, 1812), coldness and unfeeling (Schneider, 1934), and manipulation of others (Pinel, 1812/1962).

2.2.2. Cleckley

The most influential clinical portrayal of the psychopath can be found in Hervey Cleckley’s classic book, ‘The Mask of Sanity’ (Cleckley, 1941/1976). In colorful prose and rich detail, Cleckley describes case histories of psychopathic inpatients of a psychiatric hospital. Cleckley’s central thesis is that psychopathy represents severe
underlying pathology, masked by an outward appearance of robust mental health: ‘the surface of the psychopath...shows up as equal to or better than normal and gives no hint at all of a disorder within’ (Cleckley, 1976, p. 383). Cleckley defined 16 criteria for identifying psychopathy, which can broadly be split into three categories (Patrick, 2006). First, there were positive psychological adjustment criteria, including absence of nervousness, good intelligence, and social adeptness, which likely facilitate the façade of normal mental health. A second set of criteria referred to the underlying pathology and violent impulsivity recognized in earlier conceptualizations of psychopathy, including antisocial acts and failure to learn from experience (e.g. Pinel, 1806/1962). A third set of criteria described emotional unresponsiveness, mirroring the unfeeling and manipulativeness recognized by earlier writers, including a lack of remorse, poverty of affection, and inability to love (Cleckley, 1976).

Etiologically, Cleckley thought that psychopathy arose from impairment in emotional processing. This processing flaw has been likened to semantic aphasia (a language processing deficit) and color blindness (a perception processing deficit) (Patrick, 2010), and is captured succinctly by Johns and Quay (1962) in their description of the psychopath as someone who ‘knows the words but not the music’. Indeed, Cleckley noted that any emotion-processing deficit was likely to be subtle and related to failures in elaborating or interpreting the meaning of emotion. He wrote that the psychopath can ‘can learn to reproduce appropriately all the pantomime of feeling; but, as Sherrington said of the decerebrate animal, the feeling itself does not come to pass’ (Cleckley, 1976, p. 374). Other writers around the same time focused on etiological factors in the early environment of psychopathic individuals. Notably, McCord and McCord (1964) argued that parental neglect and rejection were important risk factors that make a psychopath an ‘asocial, aggressive, highly impulsive person, who feels little or no guilt, and is unable to form lasting bonds of affection with other
human beings’ (p. 3). Similarly, John Bowlby (e.g., Bowlby, 1944, 1969, 1979/2005) argued that disruption in the development of a healthy and secure attachment to a parent or primary caregiver would lead to an individual developing a detached, cold, and affectionless personality style. Indeed, the notion that secure attachment development early in life underpins a lasting and implicit interpersonal working model of the self and others, which in turn guides future interactions is well-supported empirical in attachment literature (see Erickson, Sroufe, & Egeland, 1985; Hazan & Shaver, 1987;

2.2.3. Conclusions

Across its different historical descriptions and conceptualizations, various themes emerge that have implications for the classification of psychopathy and its extension to youth. First, there is recognition that psychopathy is a personality disorder, which manifests through impulsive and aggressive violence, and alongside cold, remorseless, and calculating calm. It should be noted that these seemingly opposing dimensions are not mutually exclusive. Indeed, McCord and McCord argued a lack of social conscience enabled psychopaths to respond with violent rage. Trying to measure these dimensions of psychopathy in clinically and statistically meaningful ways, however, remains an ongoing research challenge.

Second, maintaining continuity with Cleckley’s portrayal of the dimensional, and sometimes positively adaptive, nature of psychopathic traits has proved a challenge. Often Cleckley’s criteria are seen as less valid because he worked with psychiatric inpatients who often came from middle-class backgrounds, and whose antisocial acts may have been less violent. Nevertheless, even in these cases, Cleckley’s detailed descriptions clearly highlight emotional detachment and punishment insensitivity as key
The majority of more recent research has focused on adult criminal and delinquent adolescent samples, reflecting attempts to identify a subgroup of more severe offenders. However, there is recognition that adaptations to psychopathic tendencies can be both maladaptive and adaptive, even if current measurement tools are less successful in identifying a complete dimensional model of psychopathy. Indeed, identification of psychopathy at much earlier stages of development may be a useful avenue to examine etiological factors before confounds associated with an antisocial or criminal life strategy become entrenched (see Sections 2.5 and 2.6).

Finally, earlier writings highlight an ongoing debate about the importance of early parental abuse or disrupted parent-child attachment to the development of a psychopathic personality style. In particular, since publication of his paper entitled, ‘Forty-Four Juvenile Thieves: Their Character and Home Life’, the work of John Bowlby has remained a cornerstone in the application of attachment theory to developmental psychopathology research and studies investigating the etiology of psychopathy. Bowlby concluded that positive and adaptive mental health requires that, ‘the infant and young child should experience a warm, intimate, and continuous relationship with his mother (or permanent mother substitute) in which both find satisfaction and enjoyment’ (Bowlby, 1951, p.13). Furthermore, Bowlby conceptualized psychopathy as, ‘a distinct clinical syndrome, that of the Affectionless thief, but also an unusually clear example of the distorting influence of a bad early environment upon the

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1 For example, Cleckley describes the case of Milt, who ‘confessed that he held it as nothing short of ridiculous for his parents to consider that there was any possibility of his having a personality disorder. He showed no interest in efforts to approach whatever emotional factors might lie behind his maladjustment and apparently was incapable of realizing that he had shown signs of maladjustment. His technical reasoning powers were excellent. All the information about his past was discussed. Milt made many ingenious excuses, and if too much undeniable evidence was presented for him to persist in them, he dismissed the point. He would, in response to leading questions, state at times that phases of his situation seemed serious, but it was plain that he was not moved. No evidence of any substantial affective relation with his family, with girls, or with friends could be elicited’ (Cleckley, 1941/1976, p. 166).
development of personality’ (Bowlby, 1944, p.25). The prediction of psychopathic-like behaviors versus antisocial behavior by early measures of parental harshness or lack of warmth is a focus of Chapters 2-5 of this thesis.

2.3. Modern conceptualizations of psychopathy

2.3.1. Hare

Since Cleckley, psychopathy has remained a controversial construct. It has proved an elusive phenomenon, and posed problems in relation to its definition and classification². Research has typically focused on adult male criminal samples, although more recently, studies have examined whether psychopathy can be meaningfully extended to younger and non-criminal samples (see Sections 2.5 and 2.6). Cleckley’s criteria were operationalized by Robert Hare, whose work over the past four decades has been a driving force for current research and the field of psychopathy. In his early work, Hare used a global diagnosis approach. A knowledgeable and trained clinician assigned a score to indicate an individual’s resemblance to Cleckley’s description of psychopathy on a 1-7 scale. Hare subsequently developed the Psychopathy Checklist-Revised (PCL-R; Hare, 1991; 2003) to enable more reliable and systematic assessment of psychopathy. Typically, the 20-item PCL-R (Table 1) is completed by a clinician following an interview with a criminal offender and review of their institutional record (Hare, 2003; Hare & Neumann, 2005). Items are scored according to how well they

² Psychopathy is often confused with a DSM-IV diagnosis of Antisocial Personality Disorder (APD; APA, 2000). Criteria for APD include the presence of three or more of the following: failure to conform to social norms, deceitfulness, impulsivity, aggression, disregard for safety of others, irresponsibility, and lack of remorse. There are overlapping features between psychopathy and APD, although diagnoses are not interchangeable (i.e., not all antisocial individuals are psychopaths and not all psychopaths are antisocial). Proposals for DSM-V include the introduction of an explicit antisocial/psychopathic personality disorder (see Lynam & Vachon, 2012), although this thesis considers psychopathy independently from APD.
describe the individual (scale 0-2). Total PCL-R scores are dimensional and range from 0-40. A cut-off score of 30 is often used to classify an individual as a psychopath for clinical or research purposes (Hare & Neumann, 2005).

Table 1: Items of the Psychopathy Checklist-Revised (Hare, 2003)

| 1. Glibness and/or superficial charm | 11. Promiscuous sexual behavior |
| 3. Need for stimulation and/or prone to boredom | 13. Lack of realistic, long-term goals |
| 5. Conning and/or manipulation | 15. Irresponsibility |
| 6. Lack of remorse or guilt | 16. Failure to accept responsibility for own actions |
| 7. Shallow affect | 17. Many short-term marital relationships |
| 8. Callous and/or lack of empathy | 18. Juvenile delinquency |
| 10. Poor behavioral controls | 20. Criminal versatility |

Table 1 highlights that affective/interpersonal characteristics and behavioral maladjustment/antisocial items, recognized in earlier conceptualizations of psychopathy, are well represented in the PCL-R. However, the positive-adjustment features described by Cleckley are not, which may be because items needed to index a unitary construct. Specifically, low correlations between positive items with other items may have contributed to low overall consistency of the scale, leading to those items being dropped (Patrick, 2006). Given the PCL-R was developed with incarcerated males, with the aim of identifying those individuals most at risk of later violent and criminal behavior, it seems likely that the positive adjustment items were rarely endorsed. However, Hare has also argued that assessment of criminal populations ensured a high prevalence of psychopathy, and ready availability of historical information about individuals is needed for a broad and valid assessment (Hare & Neumann, 2010).
2.3.2. Measurement

A large body of empirical literature has subsequently developed around the PCL-R. It has strong predictive and construct validity in forecasting violence and criminal recidivism (Hare & Neumann, 2008) and has been broadly referred to as ‘the gold standard measure of psychopathy’ in more than 50 articles (not by its authors) since 2001 (Hare & Neumann, 2010). The PCL-R is also the measure from which most other measures of psychopathy are derived, leading Hercz (2001) to comment that once the PCL-R was developed, ‘...it was the first time in history that everyone who said “psychopath” was saying the same thing. For research in the field, it was like a starting gun’.

Much empirical work using the PCL-R has focused on identifying its underlying factor structure. Three prominent factor models have emerged (Table 2; Figure 1). An early two-factor solution features an eight-item ‘interpersonal/affective core’, characterized by a selfish, callous and remorseless personality (Factor 1) and a nine-item ‘social deviance’ factor indexing chronically antisocial behavior (Factor 2) (Hare, 1991; Harpur, Hare, & Hakstian, 1989). However, three items did not load on either factor: ‘promiscuous sexual behavior’, ‘many short-term marital relationships’, and ‘criminal versatility’. Cooke and Michie (2001) proposed a three-factor model, which was theoretically driven and tested using item response theory, confirmatory factor analysis and cluster analytic methods. They removed four antisocial behavior items and the three items that had not loaded in the two-factor model arguing that that the remaining 13 items were conceptually distinct and psychometrically stronger indicators of the core dimensions of psychopathy. The three-factor solution comprised ‘interpersonal’, ‘affective’, and ‘lifestyle’ factors. Finally, Hare (2003) proposed a four-factor model, which included the three factors of the three-factor model, and a fourth
‘antisocial behavior’ factor, comprised of the antisocial items dropped by Cooke and Michie. An alternative version of this model nests the four factors as subordinate factors of the two-factor model (Hare, 2003).

### Table 2: Items included in factors from different factor solutions for the PCL-R

<table>
<thead>
<tr>
<th>Two-factor model (Hare, 1991; Harpur et al., 1989)</th>
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<tbody>
<tr>
<td>Factor 1 ‘interpersonal/affective’: Glibness/superficial charm; Grandiose sense of self-worth; Pathological lying; Conning/manipulation; Lack of remorse/guilt; Shallow affect; Callous/lack of empathy; Failure to accept responsibility for actions.</td>
</tr>
<tr>
<td>Factor 2 ‘socially deviant behavior’: Need for stimulation/proneness to boredom; Parasitic lifestyle; Poor behavioral controls; Early behavior problems; Lack of realistic, long-term goals; Impulsivity; Irresponsibility; Juvenile delinquency; Revocation of conditional release</td>
</tr>
<tr>
<td>PCL-R items not included: Promiscuous sexual behavior; Many short-term marital relationships; Criminal versatility</td>
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<table>
<thead>
<tr>
<th>Three-factor model (Cooke &amp; Michie, 2001)</th>
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</thead>
<tbody>
<tr>
<td>Factor 1 ‘interpersonal’: Glibness/superficial charm; Grandiose sense of self-worth; Pathological lying; Conning/manipulative</td>
</tr>
<tr>
<td>Factor 2 ‘affective’: Lack of remorse or guilt; Shallow affect; Callous/lack of empathy; Failure to accept responsibility for actions</td>
</tr>
<tr>
<td>Factor 3 ‘lifestyle’: Need for stimulation/proneness to boredom; Parasitic lifestyle; Lack of realistic, long-term goals; Impulsivity; Irresponsibility</td>
</tr>
<tr>
<td>PCL-R items not included: Poor behavioral controls; Promiscuous sexual behavior; Early behavioral problems; Many short-term marital relationships; Juvenile delinquency; Revocation of conditional release; Criminal versatility</td>
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</tbody>
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<table>
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<tr>
<th>Four-factor model (Hare, 2003)</th>
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<tbody>
<tr>
<td>Factor 1 ‘interpersonal’: Glibness/superficial charm; Grandiose sense of self-worth; Pathological lying; Conning/manipulative</td>
</tr>
<tr>
<td>Factor 2 ‘affective’: Lack of remorse or guilt; Shallow affect; Callous/lack of empathy; Failure to accept responsibility for actions</td>
</tr>
<tr>
<td>Factor 3 ‘lifestyle’: Need for stimulation/proneness to boredom; Parasitic lifestyle; Lack of realistic, long-term goals; Impulsivity; Irresponsibility</td>
</tr>
<tr>
<td>Factor 4: ‘antisocial’: Poor behavioral controls; Early behavioral problems; Juvenile delinquency; Revocation of conditional release; Criminal versatility</td>
</tr>
<tr>
<td>PCL-R items not included: Promiscuous sexual behavior; Many short-term marital relationships</td>
</tr>
</tbody>
</table>

Despite ongoing debate about the factor structure of the PCL-R, reflected in the different solutions (see Table 2), it has been widely employed across judicial settings because it successfully predicts future criminal behavior. Indeed, the PCL-R has been described as an ‘unparalleled’ single predictor of violence (Salekin, Rogers, & Sewell, 1996). However, this success seems to be a double-edged sword, which is reflected in an ongoing, and sometimes heated, debate examining the importance of antisocial behavior to definitions or measures of psychopathy (Skeem & Cooke, 2010a; Hare &
Neumann, 2010). Much of the discourse of this debate focuses on the different factor-solutions.

**Figure 1: Summary of the different factor solutions for the PCL-R**

<table>
<thead>
<tr>
<th></th>
<th>2 factor</th>
<th>3 factor</th>
<th>4 factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personality</td>
<td>Affective</td>
<td>Affective</td>
</tr>
<tr>
<td></td>
<td>Behavioral</td>
<td>Interpersonal</td>
<td>Interpersonal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lifestyle</td>
<td>Lifestyle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Antisocial</td>
</tr>
</tbody>
</table>

On one side of the debate, it has been argued that the PCL-R, and particularly the two- and four-factor solutions weight antisocial behavior items too heavily relative to emotional detachment and affective deficit items (Cooke, Michie, & Skeem, 2007; Patrick, Bradley, & Lang, 1993; Skeem & Cooke, 2010a). In support of this premise, Cleckley’s original descriptions of psychopathy place deficient affective responses, low anxiety, and superficiality as fundamental characteristics, with antisocial behavior/criminality as secondary characteristics: ‘there are so many, however, who do not, that such tendencies [criminal] should be regarded as the exceptions’ (Cleckley, 1976, p. 262). Because of its focus on antisocial behavior therefore, it has been argued that the PCL-R, and in particular the two- and four-factor solutions (e.g., Hare et al., 1990), ‘deviate significantly from [their] own theoretical underpinnings’ (Rogers, 2001, p. 302).
Indeed, studies have shown that measures simply assessing past criminal behavior may be at least as good at, or better, than the PCL-R in identifying chronic offenders (Skilling, Harris, Rice, & Quinsey, 2002) and predicting reoffending or future violence (Gendreau, Goggin, & Smith, 2003; Walters, 2003). As such, while measures of past criminal behavior and PCL-R antisocial items both capture a clinically useful and potentially stable criminality trait, this may not be specific to or synonymous with psychopathy (Blackburn, 2007). An extension of this argument is the view of Cooke and colleagues, who contend that the field of psychopathy is in danger of conflating the PCL-R, a measure of psychopathy, with the construct of psychopathy (Cooke et al., 2007; Skeem & Cooke, 2010a; 2010b). They argue that criminal behavior and psychopathy are separate constructs and in order to assess their relationship, they should be measured separately.

On the other side of the debate, history of criminality appears to almost be a given in classification of psychopathy. Hare and Neumann (2005) argued that not only does the removal of antisocial items from the three-factor model decrease its predictive capabilities in relation to violence and aggression, but that it is a fundamental misconception to argue that inclusion of antisocial items in definitions of psychopathy is inconsistent with Cleckley’s portrayal of the psychopath (Hare & Neumann, 2010). For example, Cleckley himself wrote that the psychopath ‘will commit theft, forgery, adultery, fraud, and other deeds for astonishingly small stakes’ (p. 343). Others have also concluded that antisocial behavior was central to Cleckley’s descriptions and diagnoses of psychopathy. For example, Patrick (2006, p. 608) wrote, ‘there is no question that Cleckley considered persistent antisocial deviance to be characteristic of psychopaths’. It should be noted however, that Cleckley’s writings are so detailed and complex as to enable selection of any number of quotations to support a divergent range of opinions (Hare & Neumann, 2008). Their contribution to any debate about the
conceptualization of psychopathy should be viewed with caution, and especially in relation to youth samples.

2.3.3. Implications for youth

In conceptualizing psychopathy among youth samples and trying to understand its development however, both sides of the debate outlined above are important. First, it is intuitive that early callousness and deceitfulness, coupled with a lack of guilt and empathy, could increase the development of antisocial behavior. Specifically, individuals who lack empathy may be more at risk of engaging in antisocial and criminal acts without consideration of or caring about the consequences (Cooke et al., 2007). Therefore, while a link undoubtedly exists, antisocial behavior could occur only causally downstream of psychopathy (Skeem & Cooke, 2010a). However, in support of theories that place antisocial behavior as central to definitions of psychopathy, experience of and engagement in antisocial behavior from an early age could drive the development of a callous and remorseless personality. This process could operate via a number of mechanisms, including positive reinforcement or perceived reward following violent behavior, and desensitization to victim distress, which might drive further violence.

Second, when examining psychopathy among youth, it is important to keep in mind that the construct itself remains an imperfectly defined and poorly explained phenomenon among adults. As such, this thesis has the potential to add significantly to what is known about the development and definitions of psychopathy in a number of ways. Specifically, while the downward extension of psychopathy is a useful starting point to try and understand the development of more chronic and severe forms of antisocial behavior, assessment of psychopathic-like behaviors or precursors to psychopathy in youth samples may also help to improve definitions across different
developmental periods. For example, a large literature in adult samples has broadly distinguished between ‘primary’ psychopaths, who manifest what is supposed to be a biologically driven, core deficit in emotional responding versus ‘secondary’ psychopaths, who are more impulsive and behaviorally deviant. Descriptions of secondary psychopaths have tended to focus on environmental factors that lead to acquisition of psychopathic features, resulting from abusive or neglectful parenting, or other trauma experienced during childhood (e.g., Bowlby, 1944; Karpman, 1941; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). In contrast, the development of ‘primary psychopathy’ is theorized to be driven by genetic risk (see Blair, 2003; Blair et al., 2006). At the same time, it is likely that genetically-determined individual differences in different stress response systems determines the development of psychopathic-like behaviors in response to environmental pressures (see Section 2.6.2), such that the distinction between primary versus secondary psychopaths (or a genetically- versus environmentally-driven pathway to psychopathy) is not clear-cut. For example, genetic and environmental factors are likely to interact via parenting behavior – a parent who shares genetic risk for psychopathic behavior with their child may provide the kind of early environment, which furthers exacerbate the likelihood the child will develop psychopathic behaviors (i.e., low parental affective responsivity or neglect; see Chapter 6, Figures 22). As such, investigating individual differences in the precursors to psychopathic behaviors in children and parent-child interactions at very young ages may be useful to understand better developmental trajectories leading to adult psychopathy.

Finally, it is noteworthy that many of the traits that define psychopathy are universal features of normal human functioning (e.g., deception, manipulation), which are likely controlled by many different genes, and triggered by a range of adverse (or not so adverse situations) across normal and clinic or forensic samples (see Keller &
Miller, 2006). Indeed, a large body of work in social psychology has examined the conditions under which ‘normal’ individuals are driven to manifest ‘psychopathic-like’ behavior (e.g., Milgram, 1963; Hanley, Banks, & Zimbardo, 1973). Examining individual differences in the early displays of these behaviors in young children, before they are associated with a pathological or maladaptive life strategy (such as antisocial or criminal behavior) is likely to inform definitions of psychopathy and interventions for early-starting behavior problems.

However, very few studies have adopted longitudinal designs that assess the personality features or precursors to psychopathy at multiple points from early childhood into adulthood, which limits the conclusions that can be drawn about associations between psychopathy and antisocial behavior development. Evidence from prospective, longitudinal studies does indicate however, that childhood conduct problems have their developmental roots in the preschool years (Shaw et al., 2003). Increasing evidence also supports the emergence of psychopathology early in life (Angold & Egger, 2007). Further, results of studies investigating conceptually related behaviors to those that define the features of psychopathy, including empathy (Knafo et al., 2008), prosocial behavior (Svetlova et al., 2011) and guilt (Kochanska et al., 2002), suggest that these skills mature rapidly during the toddler years.

Future studies are needed to investigate the precise nature of associations between psychopathic traits and antisocial behavior throughout childhood, including reciprocity between them. In order to do this successfully however, it seems necessary to separate assessment of psychopathic traits from assessment of antisocial behavior. Extending psychopathy to youth within this framework could serve, in fact, to preclude the debate about the importance of antisocial behavior to its definition, or the primary versus secondary psychopath debate, because associations between conduct problems and psychopathic-like behaviors can be assessed in children and adolescents as they
emerge, evolve, and develop. Indeed, psychopathic-like behaviors in young children can be considered both in the context of the adult definitions of psychopathy they may be precursors for, but also in relation to individual differences in manifestations of a range of normative, universal human behaviors. This framework is useful to both inform etiological models of psychopathy and more severe forms of antisocial behavior in adults, but also to address concerns surrounding use of the term ‘psychopath’ among youth samples. In this way, study of psychopathic features in youth represents the study a full dimension of individual differences in a range of normative socioemotional and cognitive behaviors. This thesis therefore seeks to understand the environmental, and potentially malleable, factors are associated with children manifesting individual differences at the more extreme end of these dimensions.

In describing the usefulness of applying the concept of psychopathy to children, Lynam (1997, p.434) wrote, ‘we can observe the development of the disorder before it has had an opportunity to destroy its host’, and highlighted the importance of identifying the ‘fledgling psychopath’ (Lynam, 2002). As such, it is important to keep in mind the obvious, and not so obvious, implications of the different factor solutions for psychopathy obtained with adult samples. When applied to youth samples, it may be that the successful versus non-successful, primary versus secondary, or criminal versus noncriminal distinctions for psychopathy are less salient as a focus of research. Specifically, items that make up the construct of psychopathy are clearly defined by the setting and population to which the construct is applied, and may have different real world, developmental, or contextual meaning. Among youth, research efforts therefore need to concentrate on tracing the core personality features of psychopathy back to their origins, before they are associated with specific lifetime trajectories, or patterns of antisocial behavior.
Finally, future studies should therefore also consider heterotypic continuity when assessing psychopathic behaviors in youth. Heterotypic continuity refers to the construct of psychopathy showing stability in meaning across development and context, while also showing discontinuity in expression due to age-appropriate variation in developmental capacities (Rutter & Sroufe, 2000). Trying to meaningfully apply the concept of psychopathy to youth samples however, and develop measures that make clinical and developmental sense, and demonstrate heterotypic continuity, remains an ongoing research challenge.

2.4. Subtypes of antisocial behavior among youth

Adult psychopathy research highlights the importance of the construct to clinical, research, and forensic settings. It is associated with early, stable, and severe forms of antisocial behavior, greater risk for recidivism and low responsiveness to treatment. It seems likely that the most effective preventative interventions for psychopathy need to begin very early in life. However, to develop effective interventions, research is needed to identify early signs and behavioral indicators of psychopathy, to evaluate associations with conduct problems, to examine potential risk and protective factors, and to investigate developmental trajectories of psychopathy. The construct of psychopathy needs to be studied from its infancy (Salekin & Lynam, 2010).

Extending the construct of psychopathy to children and adolescent samples has its roots in the study of adult psychopathy. Cleckley viewed psychopathy as a disorder that stemmed from childhood. McCord and McCord (1964) also argued that psychopathy needed to be identified and treated in younger populations. Finally, Bowlby theorized that disrupted attachment with a caregiver early in life would lead to development of cold, affectionless, and psychopathic-like personality style. However,
while these writers highlighted the need for psychopathy to be investigated as early as possible, empirical research directly assessing psychopathy in children did not follow for many decades. A large body of research has focused, however, on different ways to classify and subgroup antisocial behavior among children and adolescents. Within these subgroups, clear parallels emerge with conceptualizations of psychopathy. Several different approaches are discussed below, each of which recognizes a subgroup of antisocial youth, who are characterized by a lack of empathy and guilt, shallow affect, callousness, and a manipulative interpersonal style (Table 3). Furthermore, it has been proposed that psychopathic traits be included as a specifier of Conduct Disorder (CD) in the forthcoming edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; Frick & Moffitt, 2010), making them an important clinical and research target.

Table 3: Subtypes of child and adolescent antisocial behavior relevant to the concept of psychopathy in youth (adapted from Lochman et al., 2010)

<table>
<thead>
<tr>
<th>Approach</th>
<th>Subtypes</th>
<th>Description</th>
<th>Original References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differences in social characteristics</td>
<td>Undersocialized vs. socialized</td>
<td>Presence or absence of social attachments and affective/interpersonal deficits</td>
<td>Hewitt &amp; Jenkins (1946)</td>
</tr>
<tr>
<td></td>
<td>Aggressive-rejected vs. aggressive-nonrejected</td>
<td>Acceptance or rejection by peers in the presence of aggressive behavior</td>
<td>Bierman et al. (1993)</td>
</tr>
<tr>
<td>Developmental variations</td>
<td>ODD vs. CD</td>
<td>DSM-IV-TR diagnostic status</td>
<td>APA (2000)</td>
</tr>
<tr>
<td></td>
<td>Early versus late</td>
<td>Age of onset</td>
<td>Moffitt (1993)</td>
</tr>
<tr>
<td>Qualitative differences</td>
<td>Overt vs. covert behavior</td>
<td>Overt/confrontative vs. covert/concealed antisocial behavior</td>
<td>Loeber &amp; Schmalling (1985b)</td>
</tr>
<tr>
<td></td>
<td>Proactive vs. reactive behavior</td>
<td>Proactive/goal-directed vs. reactive aggression</td>
<td>Dodge &amp; Coie (1987)</td>
</tr>
<tr>
<td></td>
<td>Relational vs. physical behavior</td>
<td>Socially aggressive vs. physically aggressive antisocial behavior</td>
<td>Lagerspetz et al., (1988)</td>
</tr>
</tbody>
</table>

2.4.1. “Undersocialized” versus “socialized”

Two distinct subgroups of children with conduct disorder (CD) were classified in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III,
American Psychiatric Association, 1980): ‘undersocialized’ versus ‘socialized’ (Hewitt & Jenkins, 1946; Quay, 1964; 1965). CD refers to a pattern of behavior characterized by repetitive and persistent aggressive behavior, and violation of the rights of others through violence and other antisocial acts. Within DSM-III, ‘undersocialized’ youth with CD displayed a lack of empathy, flattened affect and limited ability to form close bonds with others, which mirrors the interpersonal and affective deficits identified in adult psychopaths (e.g. Cleckley, 1941/1976; Hare, 1991; Cooke & Michie, 2001). In contrast, ‘socialized’ youth with CD were able to develop social attachments to others (Lochman, Powell, Boxmeyer, Young, & Baden, 2010). The distinction was shown to have internal and external validity (Loeber & Schmalling, 1985a, 1985b), with the ‘undersocialized’ group demonstrating a higher level of psychopathological dysfunction and worse long-term outcomes (Quay, Routh, & Shapiro, 1987), although it does not appear in more recent forms of the DSM (DSM-IV-TR; American Psychiatric Association, 2000). However, the theoretical distinction remains salient in relation to the downward extension of the psychopathy construct to youth samples.

2.4.2. Peer status

Bierman (2004) differentiated between subgroups of antisocial youth according to peer status. Aggressive behavior has consistently been found to predict peer rejection, and these together further predict poor long-term outcomes (Coie, Lochman, Terry, & Hyman, 1992). However, evidence also suggests that aggressive behavior is sometimes associated with high levels of peer status and nonrejection. For example, Bierman, Smoot, and Aumiller (1993) compared aggressive-rejected, aggressive-nonrejected, and non-aggressive-rejected boys. Subgroups differed according to the severity and impulsiveness of their conduct problems, with worse behavioral control, hyperactivity, and verbal aggression associated with greater likelihood of rejection. In contrast,
aggressive-nonrejection was associated with more covert forms of antisocial behavior, sneakiness, and social control. The aggressive-nonrejected subgroup appears to have something in common with conceptualizations of psychopathy in adults. Specifically, they commit aggressive acts in a controlled and callous way, managing to manipulate others and maintain peer acceptance. Peer acceptance in the context of aggressive behavior therefore mirrors Cleckley’s descriptions of the charming and socially manipulative ‘mask’ of the psychopath.

In support of this premise, Waschbusch, Walsh, Andrade, King, and Carrey (2007b) found an association between conduct problems and children generating fewer prosocial and more antisocial solutions to hypothetical social problems involving sharing and friendship. However, the association only emerged for children without affective/interpersonal deficits. In contrast, conduct problems and high levels of affective/interpersonal deficits were associated with children succeeding in tasks. This does not mean however, that in real social situations, conduct-disordered children with psychopathic traits would act in a way that demonstrated capacity for sharing, friendship and prosociality, even if these children were able to recognize such behaviors were required by the task.

In a related area of research, ‘machiavellianism’ refers to the tendency to manipulate others and exploit them for personal gain (Wilson, Near, & Miller, 1996). In relation to aggressive-nonrejected children, there is evidence to support the existence of a subgroup of aggressive children who are verbally intelligent (Salekin, et al., 2004), socially adept (Sutton, Smith, & Swettenham, 1999) and popular with peers (Kaukiainen et al., 2002). Furthermore, children with high levels of ‘machiavellianism’ are perceived as aggressive, but still accepted by teachers and peers (Hawley, 2003). Early manifestations of some personality traits therefore appear to buffer children
against potentially negative consequences associated with aggressive behavior, and may even enable more successful social interactions.

Finally, it is worth noting the potential reciprocity between the occurrence of peer rejection and the development of aggressive behavior. In some children, frustration and anger at rejection could lead to an escalating cycle of antisocial behavior, and potential affiliation with deviant groups among whom antisocial behavior is further reinforced (Coie, Terry, Lenox, Lochman, & Hyman, 1995). In a different trajectory, positive reinforcement from the joint success of aggressive behavior and high peer status enjoyed by aggressive-nonrejected children could increase antisocial behavior through a reward-reinforcement cycle. In other words, different factors from the social environment may serve to reinforce the antisocial behavior of both aggressive-rejected and aggressive-nonrejected children via different mechanisms.

2.4.3. DSM-IV diagnostic criteria and age of onset

Three different diagnoses in DSM-IV-TR, Oppositional Defiant Disorder (ODD), Conduct Disorder (CD), and Attention deficit-/hyperactivity disorder (ADHD) reflect developmental and behavioral differences in youth with disruptive behavior (Table 4). First, ODD is characterized by an irritable, negativistic disposition and resistant, defiant interactions with authority figures (e.g., easily angered or deliberately annoying others). To meet ODD criteria, these behaviors must occur over at least 6 months with age of onset typically before 8 years old (APA, 2000). ODD is one of the most common disorders of childhood (Kazdin, 1995) and a leading reason for referral to mental health services (Loeber, Burke, Lahey, Winters, & Zera, 2000). Lifetime prevalence of ODD is around 10% (Nock, Kazdin, Hiripi, & Kessler, 2007), with a prevalence of 28-65% in clinical samples (Boylan, Vaillancourt, Boyle, & Szatmari, 2007). ODD symptoms are distinguishable from normative child problem behavior in preschool clinical (Keenan &
Wakschlag, 2004) and community (Lavigne et al., 1994) samples. ODD has moderate-
high stability (Cohen, Cohen, & Brook, 1993) and is a risk factor for continuing conduct problems and other psychopathologies (Burke, Loeber, Lahey, & Rathouz, 2005).

Table 4 Items included in DSM-IV-TR diagnostic criteria for Oppositional Defiant Disorder and Conduct Disorder (adapted from APA, 2000)

<table>
<thead>
<tr>
<th>Oppositional Defiant Disorder</th>
<th>Conduct Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Often loses temper</td>
<td>1. Often bullies, threatens or intimidates others</td>
</tr>
<tr>
<td>2. Often argues with adults</td>
<td>2. Often initiates physical fights</td>
</tr>
<tr>
<td>3. Often actively defies or refuses to comply with adults’ requests or rules</td>
<td>3. Has used a weapon</td>
</tr>
<tr>
<td>4. Often deliberately annoys people</td>
<td>4. Has been physically cruel to people</td>
</tr>
<tr>
<td>5. Often blames others for his or her mistakes or misbehavior</td>
<td>5. Has been physically cruel to animals</td>
</tr>
<tr>
<td>6. Is often touchy or easily annoyed by others</td>
<td>6. Has stolen while confronting a victim</td>
</tr>
<tr>
<td>7. Is often angry and resentful</td>
<td>7. Has forced someone into sexual activity</td>
</tr>
<tr>
<td>8. Is often spiteful or vindictive</td>
<td>8. Has deliberately engaged in fire setting</td>
</tr>
<tr>
<td>10. Has stolen items of a nontrivial value without confronting the victim</td>
<td>9. Has deliberately destroyed others’ property</td>
</tr>
<tr>
<td>11. Often lies to con others</td>
<td>12. Has stolen items of a nontrivial value without confronting the victim</td>
</tr>
<tr>
<td>13. Often out late without permission, starting before age 13</td>
<td>14. Has run away from home overnight at least twice</td>
</tr>
<tr>
<td>15. Often truants from school, starting before age 13</td>
<td>16. Has broken into someone else’s house, building or car</td>
</tr>
</tbody>
</table>

Second, a subgroup of children displays behavior problems throughout childhood and into adolescence. Gradually, their antisocial acts grow more delinquent and violate societal norms and the rights of others. In such cases, a diagnosis of CD may be applied. DSM-IV-TR includes four broad categories for CD symptoms: aggression to people and animals, destruction of property, deceitfulness and theft, and serious violations of rules (APA, 2000). To receive a diagnosis of CD, at least three symptoms from across these categories must have been shown for at least 12 months, with at least one symptom present in the last six months (APA, 2000). In addition, DSM-IV-TR includes a specifier for age of onset of CD; symptoms presenting before the age of 10 years old are categorized as childhood-onset CD, and after 10 years old as adolescent-onset type (APA, 2000; Moffitt, 1993; Moffitt et al., 1996). Loeber et al. (2000) reported the prevalence of CD within community samples to be 1.8%-16% in males and 0.8%-9.2% in females. This gender difference remains consistent across development.
Third, ADHD is characterized by symptoms of inattention, impulsivity and hyperactivity. ADHD has been found to significantly affect behavior and performance of children across a variety of contexts, including home and school. ADHD is one of the most widely diagnosed childhood behavior disorders in the US (see Barkley, 1998). In relation to psychopathy, it is interesting to consider the classification of ADHD among youth. Specifically, adults with psychopathy show problems relating to impulsiveness or attentional control (Hare et al., 1991). Further, children with psychopathic traits show impulsivity and narcissism (e.g., Christian et al., 1997). However, the key difference between antisocial/aggressive individuals with or without psychopathic traits appears to be in the presence or absence of callous-unemotionality (i.e., emotional processing deficits related to affective and interpersonal dimensions of psychopathy, rather than impulsive behaviors; see Section 2.5). In studying subtypes of antisocial behavior in youth, it is important to distinguish between behaviors relating to underlying emotional processing/affective deficits versus impulsive/aggression behaviors. Indeed, youth with emotional processing/affective deficits, like their adult psychopath counterparts, show a reduced responsivity to emotional stimuli (e.g., Blair et al., 2001a; 2001b). In contrast, children with ADHD show heightened reactivity to emotional stimuli (e.g., Cole, Zahn-Waxler, & Smith, 1994). Nevertheless, youth with both ADHD and callous-unemotionality are likely to be a particularly severe subgroup of antisocial youth (see Falk & Lee, 2011) and it is possible that antisocial youth who are highly impulsive may show under-reactivity to emotional stimuli in the presence of affective/emotional processing deficits (Barry et al., 2000). As such, both impulsivity/ADHD-like behaviors and affective/emotion processing deficits need be considered when evaluating development of antisocial behavior, while controlling for the presence of the other (i.e., in case of suppressor effects). Indeed, the use of psychostimulants has been shown to
reduce CU traits and ADHD symptoms among youth attending a summer camp (Waschbusch et al., 2007).

Within DSM-IV-TR, a clear distinction is also drawn between ODD and CD. First, if a diagnosis of CD is given, ODD cannot also be assigned. The distinction is supported in factor analytic work, which has demonstrated that ODD and CD symptoms load onto separate factors (Burns et al., 1997; Hartman et al., 2001). Second, although it is considered a developmental precursor and risk factor for CD (Moffitt et al., 1996), not all children with ODD develop CD (Burke et al., 2005; Lahey, Loeber, Burke, & Applegate, 2005; Loeber et al., 2000, Maughan, Rowe, Messer, Goodman, & Meltzer, 2004; Rowe, Maughan, Pickles, Costello, & Angold, 2002). Third, studies of community samples and population-based surveys have suggested that large proportions of children with CD do not concurrently meet criteria for ODD (Burke, Waldman, & Lahey, 2010). Fourth, there are differences in the prediction of future diagnoses associated with CD and dimensions of ODD symptoms. For example, ODD anger/frustration symptoms predicted emotional disorders whereas defiant/headstrong ODD behaviors predicted ADHD (Stringaris & Goodman, 2009). Further, Burke et al. (2005) found that ODD symptoms predicted year-to-year increases in a range of disorders not specific to conduct problems, including symptoms of depression, and anxiety in boys aged 7-17 years old. Finally, other studies have found that ODD is associated with various adult psychiatric illnesses, but particularly emotional disorders (Burke et al., 2005; Maughan et al., 2004; Nock et al., 2007).

Explanations for these findings can be found in temperament-based models of ODD development, which suggest that emotion dysregulation and negative affect associated with ODD are markers for internalizing and externalizing disorders later in life (Keenan & Shaw, 2003). Indeed, the results of Stringaris and Goodman suggest that the angry/irritable dimension of ODD may account for the findings that ODD is
predominantly related to and predictive of emotional disorders. In relation to the
development of psychopathy and the emergence of psychopathic-like behavior in youth,
it is also interesting that the ODD dimension of spitefulness/vindictiveness predicted
various indicators of psychopathy (Stringaris & Goodman, 2009). In general, however,
CD appears to be a better target of investigation for understanding the emergence of
psychopathy. For example, CD in boys aged 7-12 years old from low-income families
was a strong predictor of antisocial personality disorder (Lahey et al., 2005). Finally,
CD, but not ODD, predicted the antisocial factor of psychopathy (Burke, Loeber, &
Lahey, 2007).

However, while a diagnosis of CD captures some aspects of behavior that
potentially relate to later psychopathic personality traits (c.f., DSM-IV diagnosis of
APD in adults), the core interpersonal/affective features of psychopathy are not well
represented in either the ODD or CD diagnostic criteria. Indeed, early affective
psychopathic features appear to be distinct from ODD, CD and ADHD symptoms
(Dadds et al., 2005; Pardini, Obradovic, & Loeber, 2006). As such, there have been
calls for the newest version of DSM to include a CD specifier for early emergence of
psychopathy. Specifically a diagnosis of CD would be accompanied by additional
reference to either the presence or absence of callous and unemotional traits (Frick &
Moffitt, 2010).

At the same time, there are some key general limitations relating to the use of
the DSM classification of CD with preschool samples/younger children, and by
extension with the proposal of a specifier for psychopathic traits. DSM itself has been
described as a developmental, and manifesting an absence of developmental phraseology
to characterize symptoms (Wakschlag, Tolan, & Leventhal, 2010). For example, a
quarter of CD symptoms are argued to be developmentally impossible for preschool
children (e.g., forcible sexual activity), a third are developmentally improbable (e.g. fire
setting) and even ODD symptoms appear developmentally imprecise (e.g., often loses temper, often defies) (Wakschlag et al., 2007). It therefore appears problematic to apply a CD diagnosis and specifier for psychopathic traits to very young/preschool samples. By extension, it may be difficult to identify the presence of very early manifestations of psychopathy at young ages within a DSM framework.

A second subtyping approach relating to DMS-IV criteria is derived from the different age at which antisocial behavior first emerges and its trajectory through childhood, adolescence, and adulthood. Initially, Patterson, DeBaryshe, & Ramsey (1989) focused solely on an early starting or ‘life-course persistent’ subgroup, whose conduct problems began very early in life and persisted throughout development and into adulthood. McMahon, Wells, & Kotler (2006) noted that there was likely to be some overlap between this subgroup and individuals with childhood-onset CD. Moffitt (1993) extended the approach of subtyping according to age of onset further using epidemiological data, differentiating between early-onset antisocial behavior problems and adolescent-limited offenders. The distinction was based on prevalence data indicating a significant jump in the prevalence rates of antisocial behavior between the ages of 11 and 15 from 5%-32%, whereby it continues to increase until the mid-20s, when the antisocial behavior of most individuals is thought to desist (Moffitt, 1993).

Further evidence to support the distinction between the two subgroups comes from risk factor research. First, the early-onset subgroup appear to show more childhood risk factors, including measures of parenting, neurocognitive functioning and temperament (Moffitt et al., 1996). In contrast, Aguilar, Sroufe, Egeland, & Carlson (2000) did not find evidence to support differences in temperament and neuropsychological factors, although their results indicated that the early-onset group was more likely to have come from high-stress and single parent households, have experienced avoidant attachment between 12-18 months, and abusive, neglectful
parenting. Second, Patterson et al. (1989) argued that ineffective parenting practices were central to the development of the antisocial behavior of the early-onset subgroup. They described a cycle of mutually coercive and negative interactions between parent and child, which serves to reinforce negative behavior and undermine prosocial behavior.

In contrast, it has been argued that the antisocial behavior of the late starting/adolescence-limited group is motivated primarily by a desire to assert maturity, test out different personalities and acquire social status (Moffitt, 1993). Indeed, the adolescent-onset group shows higher levels of rebelliousness and rejection of conventional values relative to youth with an earlier onset of conduct problems (Dandreaux & Frick, 2009). The antisocial behavior of the adolescent onset group may be further fuelled by associations with deviant peer groups. Over time however, the antisocial behavior of this subgroup does appear to decrease, as they increasingly perceive that their delinquent behaviors to result in punishment rather than reward (Moffitt, 1993). It should be noted however, that in some cases, the offences of individuals in the late-starting group might have long-term consequences if they result in negative outcomes, such as school dropout, a criminal record, substance abuse, or incarceration (Odgers et al., 2008). Nevertheless, it has broadly been argued that the antisocial behavior of youth in the late-starting group is simply an exaggeration of normative social processes and change associated with adolescence, rather than any underlying set of antisocial behavior traits (Lochman et al., 2010). As such, in trying to conceptualize what psychopathy might mean among samples of youth, it seems unlikely that this group will hold much interest. Indeed, children with a childhood-onset CD show higher rates of psychopathic traits than those in the adolescent-onset group (Dandreaux & Frick 2009, Silverthorn, Frick, & Reynolds, 2001). The early-starting/life-course persistent youth, for whom antisocial behavior quickly becomes
entrenched and chronic, and who have experienced a range of risk factors, are therefore likely to be an important target of investigation in relation to the development of psychopathy.

2.4.4. Overt versus covert behavior

Overt antisocial behavior involves direct, active, and attention-grabbing behavior, including physical aggression, arguing, and tantrums. In contrast, covert antisocial behavior involves concealed acts that often happen without the awareness of others, including lying, truancy, and theft. Evidence supporting the distinction between overt and covert forms of antisocial behavior comes from meta-analyses (28 studies, combined $N = 11,603$; Loeber & Schmalling, 1985a; 60 studies, combined $N = 28,401$; Frick et al., 1993). It has been proposed that overt and covert behaviors represent different pathways to conduct disorder (Loeber et al., 1993; Loeber & Hay, 1994). Specifically, early-starting conduct problems (c.f., Moffitt, 1993; APA, 2000) are often first characterized by overt behaviors, but may rapidly become more sophisticated and covert in nature as severity of delinquency increases (Patterson & Yoerger, 2002). Understanding the precise mechanisms underpinning the distinction has relevance to extending psychopathy to youth samples. Specifically, overt behaviors in childhood (i.e. lying, and sneakiness) are conceptually related to interpersonal/affective aspects of adult psychopathy.

2.4.5. Proactive versus reactive aggression

Reactive aggression is defined as being in response to provocation and fulfills a perceived defensive function. It is characterized by ‘hot-blooded’ and impulsive behavioral responses, underpinned by emotion dysregulation and high levels of autonomic arousal (Frick & Morris, 2004; Shields & Cicchetti, 1998). Children with a
dominant reactive aggressive style show social information processing deficits, attributing a greater level of aggressive intent to the ambiguity of peers’ intentions, and perceiving the motivations of others as more threatening (Crick & Dodge, 1996). In contrast, proactive aggression is unprovoked and instrumental, involving coercive and dominating behavior towards others. It meets a desire for personal gain, and appears to be motivated by high levels of positive outcome and reward expectancy associated with aggressive behavior (Crick & Dodge, 1996; Pardini, Lochman, & Frick, 2003). The distinction between the function of reactive versus proactive aggression among children and adolescents was supported by a recent meta-analysis (51 studies, combined $N = 17,965$; Polman, Orobio de Castro, Koops, van Boxtel, & Merk, 2007).

Further, the profile of behavior and social-information processing deficits associated with children who demonstrate high levels of proactive aggression mirrors early descriptions of the interpersonal/affective deficits of psychopaths (e.g. Cleckley, 1941/1976; McCord & McCord, 1964). First, in support of this premise, Pardini, et al. (2003) found that delinquent adolescents with interpersonal and affective deficits exhibited a pattern of beliefs that emphasized instrumental aggression as an effective means for obtaining positive outcomes. Studies with younger children also suggest that psychopathic traits are associated with proactive aggression (Flight & Forth, 2007; Frick, Cornell, Barry, Bodin, & Dane, 2003b). Second, proactive aggression has been shown to predict antisocial outcomes. For example, proactive aggression rated during preadolescence predicted delinquency and violence (e.g., Vitaro, Brendgen, & Tremblay, 2002; Vitaro, Gendreau, Tremblay, & Olingy, 1998). Among community samples, proactive aggression at age 14 predicted adult criminality (Pulkkinen, 1996) and psychopathy (Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2010). Third, Hyde, Shaw, and Moilanen (2010) found that adolescents, who had experienced rejecting parenting and neighborhood impoverishment, developed a cognitively and
affectively disengaged stance towards society and others (termed ‘moral disengagement’). Moral disengagement mediated associations between neighborhood impoverishment and later antisocial behavior, and between empathy and later antisocial behavior. The findings suggested that the interaction between early adverse environmental experiences and certain cognitive attitudes appear to put some youth at risk of valuing aggressive strategies, and disregarding the values of society. Finally, children and adolescents rated as having high levels of proactive aggression show less emotional reactivity in response to task-frustration (Hubbard et al., 2002; Muñoz, Frick, Kimonis, & Aucoin, 2008). Youth with reactive versus proactive forms of aggression therefore seem to differ on important emotional, cognitive and behavioral characteristics (Muñoz & Frick, 2012). Early manifestation of psychopathic traits may underpin these differences, and proactively aggressive children appear to be an important subgroup for future investigation.

2.4.6. Relational versus physical aggression

Physical aggression is the most studied dimension of disruptive behavior in young children (Maughan, 2005). Physical aggression refers to physical harm and threats of harm, or the use of force against other individuals. In contrast, relational aggression refers to actions that victimize individuals by harming their self-esteem or social status. Relational aggressive acts include undermining social relationships, threats to end friendships, exclusion, spreading rumors, and social ridicule of others. Much research has examined gender differences in displays of physical versus relational aggression. Physical aggression appears to be more common among males, although decreases with age (Angold & Costello, 2001; Tremblay & Nagin, 2005), whereas relational aggression appears to be more common among females (Crick & Grotpeter, 1995). Relational aggression also has interesting implications relating to the construct of psychopathy.
Several authors have alluded to the overlap between affective/interpersonal facets of psychopathy, ‘machiavellianism’, and relational aggression. For example, Wolke, Woods, and Karstadt (2001) described relational aggression shown by youth as requiring, ‘subtle, careful planning by means of competent social skills, and, at the same time, ruthless implementation’. In addition, Sutton and Keogh (2000) found that children with high levels of ‘machiavellianism’ used strategies similar to children described as being relationally aggressive, including rumor spreading and social exclusion, but managed to maintain high social status with peers. The combination of relational aggression and ‘machiavellianism’ therefore appears particularly pertinent to models of psychopathy (see Salekin, 2006).

Interestingly, various studies have examined the association between sex and indirect forms of aggression, including relational aggression, social aggression, manipulation, and bullying. It has been argued that the social cost of direct, overt, or physical aggression may be particularly high for females, such that indirect ways of harming others may be learned instead (see Archer & Coyne, 2005). These gender differences highlight the need for studies to examine the different ways that psychopathic traits could manifest themselves. Specifically, the same socioemotional/cognitive processing deficits may underpin psychopathy in both males and females, although the behavioral expressions of these deficits appear to differ (also see Discussion, Section 6.7).

2.4.7. Overlap between subtypes and links to psychopathy

Six different subtyping approaches for youth antisocial behavior have been presented in this chapter. First, these different approaches demonstrate that there is significant heterogeneity in the forms (i.e., types of behaviors displayed), age of onset, and function (i.e., motivating factors) of youth antisocial behavior. Second, within the
different approaches, there is recognition of a subgroup of antisocial youth who exhibit behaviors that have strong theoretical links with the construct of psychopathy. Drawing across all approaches, children and adolescents displaying psychopathic-like traits have early-starting conduct problems, are proactively aggressive, appear ‘undersocialized’, maintain a relatively high social status (i.e. nonrejection by peers despite aggressive behavior), have a likely diagnosis of DSM-IV-TR CD rather than ODD, and display both relational and physical aggression.

2.5. Extending psychopathy to middle-childhood and adolescent samples

While manifestations of psychopathic-like behaviors have long been recognized within different approaches to subtyping antisocial behavior, including an early attempt to differentiate between ‘socialized’ and ‘undersocialized’ youth with conduct problems (see Section 2.4), it has only been in the last 15 years that studies have attempted to directly measure psychopathy among youth samples. This research has been fuelled by a keenness to identify those children and adolescents most at risk of developing severe and chronic forms of antisocial behavior and criminality. In addition, it has been hypothesized that the presence or absence of psychopathic traits in the development of antisocial behavior in youth represents unique etiological processes. Research efforts have concentrated on extending the interpersonal and affective factors central to historical conceptualizations of adult psychopathy (Cleckley, 1941/1976; Hare, 1991). Indeed, the extension of the construct of psychopathy to youth has its origins firmly in the adult literature. Interpersonal and affective dimensions of psychopathy in children and adolescents have been referred to as Callous-Unemotional (CU) traits (Frick, O’Brien, Wootton, & McBurnett, 1994; Frick, 2004). High levels of CU traits in youth
refers to the presence of the interpersonal (including deceitfulness, grandiosity, superficial charm, and manipulativeness) and affective (including shallow affect, low empathic concern for others and lack of guilt or remorse) features of psychopathy (Frick et al., 1994; Pardini et al., 2003).

To date, the majority of research on CU traits has been carried out in samples of youth from middle childhood and adolescence. Before the possibility of extending the construct of psychopathy further to even younger, preschool samples can be considered therefore, it is important to evaluate the broad pattern of results from older children and adolescents. Specifically, a number of key areas of research investigating the validity of psychopathic behaviors among youth samples are presented. First, research investigating the measurement of CU traits is discussed. Second, the results of longitudinal studies that have investigated the stability of CU traits among samples of children and adolescents are evaluated. Third, the predictive validity of CU traits and their ability to delineate a more severe subgroup of antisocial youth is discussed. Fourth, evidence from studies that have investigated socioemotional and cognitive characteristics of youth with CU traits is discussed. Finally, the findings of these studies are evaluated in the context of studies that have investigated neurobiological underpinnings of CU traits and early manifestations of psychopathy.

2.5.1. Measurement of CU traits

When the construct of psychopathy was first applied to children and adolescent samples, two issues arose early on. First, there was recognition of the inappropriateness of items of the PCL-R and other adult measures of psychopathy for use with children. For example, ‘many short-term marital relationships’ and ‘promiscuous sexual behavior’ seemed particularly inapplicable. Second, other PCL-R items could be seen as developmentally normative for children and adolescent, meaning that they would lack
the same discriminatory power compared to their use among adult samples. For example, both ‘need for simulation and/or prone to boredom’ and ‘lack of realistic, long-term goals’ could be seen as common characteristics of many children or adolescents. Keeping these two caveats in mind, research efforts therefore initially concentrated on adapting items from adult measures of psychopathy, and particularly items related to the affective/interpersonal factor.

First, the PCL-Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) was developed directly from the adult PCL-R. The PCL:YV includes the 20 items of the PCL-R, although many were adapted and made relevant for use with youth (Table 1.5). The PCL:YV, like the PCL-R, is completed by a trained and knowledgeable clinician, with items scored on a three-point scale. It tends to be used with adolescents aged 13 years or older, and may therefore be limited in its applicability to younger children. The PCL:YV has been the subject of similar factor analytic work as its adult counterpart.

Various studies suggest that the PCL:YV fits a two-factor solution (‘interpersonal/affective’ versus ‘socially deviant’ factors; Brandt, Kennedy, Patrick, & Curtin, 1997; Forth et al., 2003), a three-factor solution (13 items and separate ‘interpersonal’, ‘affective’ and ‘behavioral’ factors; Neumann, Kosson, Forth, & Hare, 2006), and a four-factor solution (18 items and separate ‘interpersonal’, ‘affective’, ‘lifestyle’ and ‘antisocial factors’; Jones, Cauffman, Miller, Mulvey, 2006; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002).

Mirroring debates in the adult literature, concerns center on the heavy weighting of antisocial items within the PCL:YV. As with the PCL-R, the PCL:YV is invariably used in forensic settings with incarcerated adolescents, requiring background information on past behavior to enable a clinician to make a full and accurate assessment. When used with adolescents in forensic settings, PCL:YV scores are associated with more severe forms of antisocial behavior and future criminal activity.
(e.g., Edens, Skeem, Cruise, & Cauffman, 2001; Gretton et al., 2001). However, the assumption that antisocial behavior is a predominant and driving force in the expression of psychopathy undermines the generalizability of the PCL:YV. In particular, it is unlikely that the PCL:YV can identify individual differences in psychopathic traits among non-forensic, community samples of adolescents who do not display the same high levels of behavior problems, or younger samples of children, for whom items are likely to lack both developmental appropriateness and construct validity.

A second measure of youth psychopathy derived directly from the PCL-R is the 20-item Antisocial Process Screening Device (APSD; Frick & Hare, 2002). Unlike the PCL:YV, the APSD can be completed by parents/caregivers or teachers, and has a youth self-report version. The APSD can be used with samples of significantly varying ages, and to date, it has been used with children aged 4-18 years old. Analyses of the factor structure of the APSD have largely supported a three-factor solution in both clinic-referred and community samples. For example, Frick, Bodin, and Barry (2000) investigated the APSD among 1136 children (7-11 years old) from a community sample, and 160 clinic-referred children (6-13 years old). A three-factor solution (impulsivity/conduct problem’ factor; CU traits factor; ‘narcissism’ factor) fit the data best. This solution was replicated among 11 year-old children from a community and separate high-risk sample enrolled in the Fast Track program, although the model fit was better for boys than girls (Kotler, McMahon and the Conduct Problems Prevention Research Group, 2002, 2003).

As with adult and youth versions of the PCL-R, however, continuing debate centers on the best way to conceptualize different dimensions of psychopathy assessed using the APSD. Specific limitations with the preferred three-factor solution center firstly on the apparent inadequate stability and poor internal consistency of items within factors (Frick et al., 2003b). As with the debate surrounding the PCL-R however, it
could be argued that improved understanding can never happen simply by studies providing alternative factor analytic solutions of the same 20 items (Skeem & Cooke, 2010a). Nevertheless, the debate remains important insofar as the limitations presented demonstrate both the imperfectness of current measures to assess psychopathy in youth, while simultaneously supporting a consistent separation of an ‘antisocial/behavioral deviance’ factor versus an ‘interpersonal/affective’ factor. Other well-documented drawbacks of the CU traits subscale of the APSD, include the small number of items \( n = 6 \), poor internal consistency of subscales, and limited range of response options \( N = 3 \), which reduces the variance of scores obtained (Kotler & McMahon, 2010). At the same time, a low alpha alone may not necessarily indicate that the CU traits scale is invalid. Indeed, many studies have carefully examined both psychometric properties of scales and construct validity. Specifically, when assessed in youth, measures of CU traits show a pattern of correlations with temperamental and behavioral characteristics related to conceptualizations of psychopathy presentation in adults (see Sections 2.5.3. and 2.5.4; Kotler & McMahon, 2005).

In this context, two specific CU traits measures were developed (Table 5), which both exclude pure antisocial/impulsivity items. Pardini et al. (2006) developed an eight-item parent- and teacher-report measure of Interpersonal-Callousness, which was validated in all three grade-based cohorts of the Pittsburgh Youth Study. The eight items are rated on a 3-point scale and were selected either from the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) or were items supplied by investigators. Internal consistency of the measure of Interpersonal-Callousness has been shown to be high (Pardini et al., 2006; Pardini & Loeber, 2008), however its use has been restricted to adolescent samples. A second measure assessing CU traits is the 24-item Inventory of Callous-Unemotional Traits (ICU; Frick, 2004). The 24 items were derived from the four original APSD CU items, to which additional items reflecting
similar content were added (see Chapter 4, Section 4.1.4). For the 24 items, factor analytic work supports the existence of three dimensions. These have been termed, ‘uncaring’, ‘callousness’, and ‘unemotional’ (Table 5), although no studies have evaluated differential correlates or unique predictive capabilities of these dimensions. Each item is scored on a four-point scale and summed to give a total score, therefore enabling greater variance in scores obtained than the APSD. The ICU has been validated in detained (Kimonis et al., 2008b) and community (Essau, Sasagawa, & Frick, 2006) samples of adolescents, and more recently among younger samples of children (Houghton, Hunter & Crow, 2012; Ezpeleta, de la Osa, Granero, Penelo, & Domènech, 2012).

Table 5 Item content of the measure of Interpersonal-Callousness (Pardini et al., 2006) and the Inventory of Callous Unemotional Traits (Frick, 2004)

<table>
<thead>
<tr>
<th>Measure of Interpersonal-Callousness (parent/teacher version)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You cannot trust what he/she says 2. He/she does not keep promises 3. He/she acts sneakily 4. He/she manipulates people</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inventory of Callous Unemotional Traits (items listed according to three-factor structure) (self-report version shown, but parent- or teacher-versions also used)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uncaring</strong></td>
</tr>
<tr>
<td><strong>I</strong> always try my best (R)</td>
</tr>
<tr>
<td><strong>I</strong> care about how well I do at school or work (R)</td>
</tr>
<tr>
<td><strong>I</strong> do things to make others feel good (R)</td>
</tr>
<tr>
<td><strong>I</strong> apologize (‘say I am sorry’) to persons I hurt (R)</td>
</tr>
<tr>
<td><strong>I</strong> feel bad or guilty when I do something wrong (R)</td>
</tr>
<tr>
<td><strong>I</strong> easily admit to being wrong (R)</td>
</tr>
<tr>
<td><strong>Callousness</strong></td>
</tr>
<tr>
<td><strong>I</strong> do not like to put the time into doing things well.</td>
</tr>
<tr>
<td><strong>I</strong> do not feel remorseful when I do something wrong.</td>
</tr>
<tr>
<td><strong>I</strong> do not care about being on time</td>
</tr>
<tr>
<td><strong>I</strong> do not care if I get into trouble</td>
</tr>
</tbody>
</table>

Note. (R) indicates that the item is reverse-scored
2.5.2. Stability of CU traits

First, several studies have shown that psychopathic traits in general show stability from adolescence into adulthood (Burke et al., 2007; Blonigen, Hicks, Krueger, Patrick, Iacono, 2006; Forsman, Lichtenstein, Andershed, & Larsson, 2008; Lynam, Caspi, Moffitt, Loeber, Stouthamer-Loeber, 2007). Moderate stability estimates have been found even for time spans of up to nine years for total psychopathy scores (Lynam et al., 2007). However, the estimates obtained across these studies seem in part to be driven by greater stability in the impulsivity, lifestyle, and antisocial facets of psychopathy in adolescence, rather than by interpersonal/affective deficits or CU traits. In contrast, Loney, Taylor, Butler, and Iacono (2007a) found that measures of emotional detachment and antisocial features displayed roughly similar rank-order stability estimates (.40 and .41 respectively) moving from adolescence to adulthood over a 6 year period in a large sample of males (N = 475).

A somewhat similar pattern has been found in studies investigating stability of CU traits across adolescence. First, Muñoz and Frick (2007) found moderate rank-order stability for self-reported CU traits (.48) and high rank-order stability over a two year period for parent-reported CU traits (.71) in a community sample of 13 years olds oversampled for conduct problems (N = 91). Second, Pardini and Loeber (2008) found that parent-reported interpersonal callousness showed high stability one year (.61-69) and moderate stability over four years (.49) among the oldest-aged cohort of the Pittsburgh Youth Study (N = 506; aged 14 years at first assessment). A latent model indicated flat, stable growth over the four years. However, mean-level stability estimates suggested that overall, interpersonal callousness decreased and individual-stability analysis over the four-years indicated that there was stability, decreases and increases in interpersonal callousness.
In middle childhood and pre-adolescence, similar estimates have been obtained. First, Obradovic, Pardini, Long, and Loeber (2007) assessed interpersonal callousness annually over nine years in boys from the youngest-aged cohort of the Pittsburgh Youth Study ($N=506$; aged 8 at baseline). Rank-order stability was highest for 1- and 2-year correlations using parent-reported interpersonal callousness (.71-.84). Three- to 8-year correlations were also high for parent reports of interpersonal callousness (.50-.71). The pattern of results from teacher reports suggested lower rank-order stability but this was explained as being due to the fact that teachers invariably change year-on-year (Obradović et al., 2007). Second, Barry, Barry, Deming, and Lochman (2008) found that CU traits maintained high within-informant stability over one- (.57-.64) and two-year periods (.60) in a high risk, aggressive sample aged 9-12 years old ($N=76$). Third, Pardini et al. (2007) investigated the stability of CU traits in children aged 9-12 years old ($N=120$) and obtained high estimates for one-year rank order stability using combined parent and teacher reports (.59). Fourth, Frick et al. (2003a) found that CU traits had high rank order stability over four years (> .70) in a small sample of children ($N=98$, mean age = 10.65 at baseline). Individual-level stability estimates indicated however, that of those children initially ranked as showing high levels of CU traits, only 30% maintained those high levels. Finally, in a large community sample of children aged 4-9 years ($N=780$), Dadds et al. (2005) found CU traits to have moderate rank-order stability (.55) over a year.

Broadly, the findings across samples of children, adolescents and into adulthood suggest that stability in CU traits over several years is at best, moderate. The estimates of stability appear higher when the same informant (invariably the parent) is used across different assessments and when follow-up periods are shorter. Indeed, the relevance of informant (i.e., teacher versus parent versus youth) about levels or presence CU traits to findings is important, and is considered in detail in Chapter 3 (Section 3.3.1).
Individual-stability estimates and mean-level differences suggest however, that a significant proportion of youth exhibit change in their CU traits over development.

Three strands of research seem important in relation to this pattern of results. First, it is important to establish causes of and explanations for stability in the CU traits of certain youth. Second, understanding why CU traits are not stable and do change is equally important, which may broadly correspond to a search for protective factors (Salekin & Lochman, 2008). Third, and relatedly, an understanding of factors that drive change in CU traits is important for the development of effective preventative or intervention strategies.

Finally, it is important to consider the separation of CU traits from general measures of antisocial behavior in relation to examining stability. For example, some studies investigate stability of more general indicators of aggressive or antisocial behavior. Indeed, studies investigating trajectories of antisocial behavior in general report comparably high levels of stability. For example, among a large sample of seven Dutch birth cohorts, Stanger, Achenbach, and Verhulst (1997) found that intra-class correlations for physically aggressive behavior across 2-, 4-, 6- and 8-year assessment points were high (e.g., .69, .60, .55, and .48, respectively) (also see Lynam et al., 2009; Moffitt, 1993). As outlined above, other studies have specifically tested the stability of CU traits in isolation from measures of aggressive or antisocial behavior. However, it is unclear from studies that consider antisocial behavior or CU traits in isolation whether one or the other is more important in driving apparent stability. Thus, when considering stability, future studies need to more precisely investigate how stability in CU traits versus antisocial behavior could be reciprocally related over time (see Section 2.3.3). For example, Fontaine, McCrory, Boivin, Moffitt, and Viding (2011) used growth mixture modeling to select empirically a four-trajectory model for CU traits (stable high, increasing, decreasing, stable low) and a two-trajectory model for antisocial
behavior (high versus low). Seven trajectories that jointly took into account CU traits and antisocial behavior were identified. Interestingly, this approach demonstrated that a large proportion of youth in the sample had changing scores across time (also see Chapter 3). Further, the sophisticated modeling approach is a useful example of how future studies could examine stability by jointly considering associations between antisocial behavior and CU traits over time.

2.5.3. CU traits and severe antisocial behavior

In addition to demonstrating moderate stability over time, there is evidence that youth psychopathic traits, and particularly CU traits, identify individuals with severe forms of antisocial behavior. First, among adolescent samples, Leistico, Salekin, DeCoster, and Rogers (2008) assessed 95 studies in a meta-analysis (combined $N = 15,826$; adolescents, $N = 2553$) and found that adolescents with high levels of psychopathic traits were as likely as psychopathic adults to offend in the future. In a review of 24 studies (22 independent samples), Frick and Dickens (2006) found that CU traits were cross-sectionally associated with aggressive, antisocial, and delinquent behavior in 10 studies. In addition, 14 studies indicated these associations to be predictive, with follow-up periods ranging across studies from six months up to 10 years. The studies included youth ranging in age from 4-20 years old from across community, clinic-referred and forensic settings. Both reviews indicate that general psychopathic traits, and CU traits in isolation, are broadly predictive of criminality and delinquency across development and in a range of samples.

Second, a similar pattern of results emerges from studies of middle childhood and pre-adolescent samples. First, Frick et al. (2003a) found that high levels of CU traits and conduct problems predicted higher levels of delinquency and proactive aggression one year later in a community sample of children ($N = 98$; mean age = 12.43). Second,
Christian, Frick, Hill, Tyler, and Frazer (1997) found that total psychopathy scores and impulsivity/conduct problem factor scores were associated with aggression in 120 clinic-referred children (aged 6-13 years). Children with higher impulsivity/conduct problem scores were also more likely to have a diagnosis of CD or ODD. In addition, children who had higher total psychopathy scores were found to have already had more police contacts and school suspensions than a clinic-control group of children. Third, although fewer studies have assessed the predictive validity of CU traits in preschool children, two studies have shown their potential importance as a marker for more severe forms of conduct problems. Dadds et al. (2005) assessed children aged 4-9 years old twice, one year apart (N = 1359). CU traits at the first time point predicted antisocial behavior one year later, controlling for earlier antisocial behavior. Kimonis et al. (2006a) also investigated the association of CU traits with more severe aggressive behavior in a sample of young children from Head Start programs (N = 49). CU traits were cross-sectionally associated with overall aggression and proactive aggression, but not reactive aggression (see Section 2.4.5).

At the same time, it is important to keep in mind the relatively high correlations obtained between measure of CU traits and youth antisocial behavior (sometimes as high as r = .70). As with the adult literature, an ongoing challenge is the need for measures that separately assess socioemotional and affective characteristics central to the construct of CU traits/psychopathy versus more general indicators of antisocial behavior (see Section 2.3.2). The current thesis tests a two-factor versus one-factor solution to examine the separation of CU traits items versus aggressive-oppositional items in young children (see Section 4.4.1).
2.5.4. Cognitive and socioemotional processing deficits associated with CU traits

Another area of research has assessed whether CU traits in youth are associated with the same characteristics associated with interpersonal/affective features of adult psychopathy. Adult psychopaths display information processing deficits (e.g. Cleckley, 1941/1976; Hare, 1991), emotional processing deficits (Levenston, Patrick, Bradley, Lang, 2000; Patrick et al., 1993), and neurocognitive deficits (e.g., Newman & Schmitt, 1998). The presence of similar deficits in children and adolescents with high levels of CU traits would be useful to identify a homogeneous subgroup of antisocial youth and further validate the construct of CU traits/psychopathy among youth samples.

Furthermore, the presence of emotional and neurocognitive processing deficits may have important etiological implications for causal models of the development of psychopathy. As with other areas of investigation into CU traits however, an important caveat is that the majority of work to date has been carried out with clinic-referred or forensic samples of adolescent or pre-adolescent samples. Further, this area of investigation draws across a variety of methodologies, including laboratory-based tasks and brain imaging techniques.

First, a number of studies have investigated emotional processing deficits in samples of antisocial youth. First, Blair (1999) found that boys with high levels of CU traits (aged 8-17) were significantly less responsive to distress cues in pictures, but not threat cues, compared to boys with behavioral problems and community controls with low levels of CU traits. Second, high levels of CU traits have been associated with a greater number of errors in recognizing fearful and sad expressions of emotion in a community sample of adolescents aged 11-15 years old (Blair & Coles; 2000) and a clinic-referred sample aged 8-15 years old (Dadds et al., 2006a). Third, boys aged 9-17 years old with high levels of CU traits were slower to recognize sad and fearful
expressions, when faces appeared by only gradually coming into focus (Blair et al., 2001a). Interestingly however, when boys in the Dadds et al. (2006a) study were explicitly told to attend to the eyes of the faces, the processing deficit disappeared.

Fourth, in a different type of paradigm, Loney et al. (2003) assessed the lexical decision making ability of clinic-referred adolescent boys (aged 12-18; \( N = 60 \)) to negative, positive and neutral letter strings. For negative emotional words, the presence of high levels of CU traits was associated with slower speed of recognition. Interestingly, this deficit was confined to CU traits, and was not associated with either the impulsivity or the narcissism dimensions of psychopathy.

Across these studies, there is evidence to suggest that youth with high levels of CU traits exhibit deficits in reactivity to facial expressions of fear and distress (albeit in majority male samples). Furthermore, the deficit is not exhibited for positive emotional stimuli, such as expressions of happiness. Deficits in emotion processing have previously been used to explain the ability of psychopathic individuals to cause harm to others (Cleckley, 1941/1976; Hare, 1991; McCord & McCord, 1964) and this premise is supported by studies of youth. The findings of Dadds and colleagues further suggest that deficits in responding to the fear/distress of others may relate to an inattention to the eyes of others, although replication of this finding is needed. The results of Loney et al. (2003) suggest that the emotional processing deficit associated with high levels of CU traits relates specifically to the reactivity of youth to emotional expressions of emotion. In other words, the CU traits do not preclude understanding of, or ability to recognize, the meaning of emotions (c.f., Johns & Quay, 1962). Likewise, the findings relate to an emerging literature investigating ‘machiavellianism’ (Wilson et al., 1996; Sutton et al., 1999), and a large body of evidence, demonstrating that psychopaths are capable of manipulating others for their own gain. An understanding of the meaning of
emotions for others is needed for such strategies, even if this is not accompanied by contingent responsivity to others’ expressions of fear or distress.

The validity of the construct of CU traits and behavioral differences between children with high versus low levels of CU traits is further supported by neurobiological studies. The amygdala has long been a focus of investigation to understand emotional dysfunction in psychopathic adults (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Viding, 2004). Research has also begun to investigate these brain areas in youth samples, with results broadly mirroring those found in adult samples. First, there is evidence that supports dysfunction in the same emotional processing areas identified in studies of adult psychopaths. For example, reduced amygdala responses to fearful expression of emotions have been found for adolescents with high levels of CU and conduct disorder (Marsh et al., 2008). Second, high levels of CU in antisocial adolescents are associated with reduced autonomic activity to the distress of others (e.g., Blair, 1999). However, no studies have tested the amygdala responses or autonomic reactivity of very young samples of children in response to others’ distress or fear.

Other studies have investigated cognitive processing deficits. First, children with high levels of CU traits show reduced sensitivity to punishment when responses that were previously associated with reward are punished (Barry et al., 2000). Second, Blair et al. (2001b) found that boys with high levels of CU traits were less likely to avoid high-risk sets of cards, demonstrating a reward-focused, and punishment-insensitive cognitive style. Third, Blair, Monson, and Frederickson (2001c) found that adolescents with high levels of CU traits made significantly more errors when distinguishing between morally wrong actions and actions that were contextually wrong. In other words, they recognized only that it was wrong to commit certain actions because they were ‘against the rules’, but not because of their potential to cause harm and distress to others. Finally, only a few studies have investigated the relation between CU traits and
intelligence, although there is some evidence to suggest that youth with high levels of 
CU traits have higher verbal IQ than those with low levels of CU traits (e.g. Loney, 
Frick, Ellis, & McCoy, 1998; Salekin et al., 2004). These results resonate with studies 
that have investigated the concept of ‘machiavellianism’, and its overlap with CU traits. 
Specifically, a subgroup of antisocial youth who are both callous and intelligent seem 
particularly effective in their ability to control, coerce and bully others, using a 
combination of relational and instrumental aggression strategies (Salekin, 2006; Wolke 
et al., 2001).

Across studies investigating cognitive characteristics in youth, there has been a 
focus on older, male samples of children, and clinic-referred or incarcerated 
adolescents. With this caveat in mind, the results indicate that antisocial youth with high 
levels of CU traits demonstrate reduced sensitivity to punishment cues when a reward-
set has been primed, deficits in moral reasoning, and higher verbal IQ than antisocial 
youth with low levels of CU traits. Future studies are needed however, to examine the 
profile of these characteristics in much younger samples. It is also unclear how the 
cognitive and emotional processing deficits shown by adult, adolescent, and pre-
adolescent samples are causally related to dimensions of psychopathy. Longitudinal 
investigations of children starting at a very young age would help elucidate how the 
early emergence of psychopathic-like behavior interacts with development of the 
emotional and cognitive processing deficits that so clearly demarcate older samples of 
antisocial individuals with high levels of CU traits.\footnote{For example, Marsh et al. (2008, p.718) outlined a 'patient perspective', which describes the case of Mark, a 12-year-old boy who 'is well liked by his peers; he is confident and charismatic and is an entertaining storyteller. His popularity contrasts with the behavior he exhibits with his family and peers, however. With his parents, he is defiant, deceitful, or manipulative in order to achieve his desired outcomes. With siblings and peers, he tends toward verbal and physical intimidation. He engages in physical fights, shoplifts from stores, and engages in frequent fire-setting. He particularly likes fireworks; recently he set of several fireworks outside his school and videotaped the aftermath. His father states that Mark has never appeared to experience guilt or regret after engaging in these sorts of behaviors and that he seems to be “totally self-centered”.'}
Studies have also begun to investigate neurobiological underpinnings of the cognitive characteristics of youth with high CU traits, in particular relating to their lack of sensitivity to punishment cues when a reward-set has been primed. Research has focused on the ventromedial prefrontal cortex (vmPFC), which functionally underpins reversal-learning tasks. The vmPFC is thought to have two roles related to reversal learning; signaling prediction errors and representing the reward expectancy associated with different responses (Budhani, Marsh, Pine, & Blair, 2007). In tasks where previously rewarded responses switch to being punished, the vmPFC first functions to signal that errors are being made. Second, the vmPFC signals lower reward expectancy for the now-incorrect response and higher reward expectancy for the now-correct response, therefore signaling to the individual that their response needs to change (Hampton, Bossaerts, & O'Doherty, 2006). Dysfunction in the vmPFC results in an individual remaining fixed on the initial reward and unable to switch their response. This impairment could explain both the highly reward-driven proactive aggression of psychopathic individuals and the aggression shown if their goals are frustrated (Blair, 2004). However, no studies have yet investigated prospective associations between contingency based learning deficits, associated neurobiological dysfunction, and the emergence of psychopathic tendencies assessing very young children.

2.6. Extending psychopathy to preschool children

2.6.1. Conceptual overlap in behaviors

A key theoretical and empirical challenge surrounding the extension of psychopathy to preschool children centers on whether individual differences in behaviors relating to the concept of psychopathy can be identified in very young children. It is noteworthy that
for many of the behavioral indicators of psychopathy, it is a deficit in a certain characteristic (e.g., a lack of empathy or guilt), that defines measurement. If psychopathy is applied to even younger children, it is important to demonstrate empirically that children actually have the developmental substrates in place to manifest those behaviors (and by extension perhaps a lack of/individual differences in them) in the first place (Wakschlag et al., 2010). A significant body of evidence does indicate that it is possible to measure psychopathic-like behaviors in preschool children because individual differences in behaviors related to conceptualizations of psychopathy are present from a young age. Further, there is some significant overlap in these behaviors and the purported neurobiological systems underpinning them with the findings that have investigated the cognitive and socioemotional processing deficits of youth with CU traits (see Section 2.5.4).

First, the capacity for empathic behavior appears to be in place by the early preschool phase of childhood (Kochanska & Aksan, 2006). Empathic concern and distress emerge during infancy, solidify across early childhood (Zahn-Waxler, Robinson, & Emde, 1992), and further develop into instrumental attempts to provide comfort in toddlers and representations of ‘how to help’ by preschool age (Hay, 2005; Hay & Cook, 2007). From 14 months old, infants have been found to shown direct spontaneous and unrewarded instrumental helping behaviors towards others (Zahn-Waxler & Radke-Yarrow, 1990; Warneken & Tomasello, 2009). By 17 months old, 50% of children ‘sometimes or often’ comfort another child showing distress (Baillargeon et al., 2007). Over the preschool period therefore, there appears to be a shift in focus from simply feeling distress to deliberate expressions of concern and attempts to comfort as greater perspective-taking skills develop (Hoffman, 2007).

Second, preschool children demonstrate stable individual differences in prosocial behavior, including sharing, and helping actions. These types of behavior
relate to quality of friendships, peer rejection or affiliation and, potentially, to early individual differences in behaviors relevant to psychopathy. Infants as young as 6 months old preferentially interact with someone who is shown to have helped, rather than hindered, another person (Hamlin, Wynn, & Bloom, 2007). In addition, between 2-4 years old children’s perspective-taking abilities develop (Eisenberg et al., 1999) and their ability to recognize the emotions of others increases (Borke, 1971). These skills enable children to tailor their prosocial acts sensitively (Levitt, Weber, Clark, & McDonnell, 1985). Indeed, by 3 years old, children appear to be selective in their prosociality, as they choose not to help people they perceive to be intending harm or distress (see Vaish, Carpenter, & Tomasello, 2010). Evidence therefore supports the premise that preschool children express and act out concern for others. Furthermore, fewer antisocial problems in middle childhood are predicted by higher internalization of maternal rules and empathic concern in the preschool years (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges 2000; Kochanska, Barry, Aksan, & Boldt, 2008) highlighting the potential role of parental practices in the development of behaviors related to CU traits in early childhood.

Third, there is evidence to suggest that individual differences exist in the types of aggression that preschool children display, which relates to subtyping approaches to youth antisocial behavior (see Section 2.4). For example, there is evidence that the distinction between reactive and proactive aggression is evident in children as young as 18 months old (Hay, Castle, & Davies, 2000). The use of proactive aggression strategies in young children (e.g., purposefully hurting others) is thought to be rare, such that it may be an important indicator of psychopathy (or at the very least, indicative of a more severe form of conduct problems). In support of its rarity, Carter, Briggs-Gowan, McCarthy, and Wakschlag (2009) found that while 19% of 2 year olds and 15% of 3 year olds display reactive aggression especially when frustrated, only 1% of children at
either 2 or 3 years old are reported to ‘hurt others on purpose’. Perhaps in combination with low levels of concern or empathy and low prosociality, the emergence of a proactive aggressive style may be a particularly salient marker for early psychopathic tendencies.

Fourth, evidence suggests that young children can recognize and engage in deceptive behaviors, including lying. A significant body of research shows that conceptualization and moral understanding of lying emerges in children at around 3 years of age (Bussey, 1992, 1999; Lee, 2000). A related strand of research has investigated children’s actual lie-telling and deceptive behavior. Deception refers to behavior that misleads others, which requires knowledge of the beliefs of both the deceiver and the person being deceived (Wilson, Smith, & Ross, 2003). Lying refers to the behavior of making a false statement to another person, leading to that false information being instilled in his or her mind (Lee, 2000). Successful lying requires theory of mind; the ability to attribute mental states to self and others, including their knowledge, beliefs, and intentions (Baron-Cohen, 2010). In the case of lying, children must first be able to assess the difference between their mental state and the mental state of the person they are attempting to deceive. Second, verbal and nonverbal communications are needed that support the deception, with subsequent behaviors that conceal the act of lying.

In young children, this sequence of behavior has been investigated using versions of the ‘temptation resistance paradigm’ (Sears, Rau, & Alpert, 1965). Broadly, children are told not to look at a tempting object, then left alone and finally asked whether they had ‘peeked’ at the object (i.e., children are given the opportunity to commit a transgression and then lie about it). Results suggest that approximately 33% of children aged 3 years old lie about committing a transgression (Lewis et al., 1989; Talwar & Lee, 2002). In addition, studies have found that preschool children can mask
their deception and lie-telling using facial expressions (e.g., Crossman & Lewis, 2006; Talwar & Lee, 2002). Other studies have assessed the relationship between theory of mind and lie-telling. Chandler, Fritz, and Hala (1989) found that 3-year-old children could intentionally create a false belief in another person by withholding information or planting false information. Finally, studies have found that young children’s ability to lie and deny wrongdoing relates to inhibitory control skills (Evans, Xu, & Lee 2011; Talwar & Lee, 2008). It is important to note that there may be some normative function of lying for young children in relation to developing theory of mind skills and understanding other’s perspectives, such that lying and deception may not necessarily be problematic. However, results from this developmental literature support the premise that preschool children are successfully able to lie and use deceptive behaviors to conceal transgressions.

Fifth, a broad and multidisciplinary area of research has focused on guilt and discomfort in the development of rule-governed behavior and conscience (e.g., Lewis, Sullivan, Stanger, & Weiss, 1989; Kochanska & Aksan, 2006; Kochanska, Koenig, Barry, Kim, & Yoon, 2010). Kochanska and colleagues have demonstrated that young children’s rule-compatible conduct and moral emotions constitute two main components of early conscience (e.g., Kochanska, Forman, Aksan, & Dunbar, 2005). Their empirical investigations have employed a wide-ranging and well-validated battery of experimental paradigms that assess conscience, inhibitory control, guilt, and understanding of rules. Tasks include assessment of a child’s internalization of their mother’s request (by testing whether they sustain a mundane activity in the absence of surveillance), their internalization of experimenter rules (whether they play a game in the absence of surveillance without cheating) (see Kochanska, Coy, & Murray, 2001), their response to being induced to violate established rules of conduct, their response to hypothetical
moral dilemmas through story vignettes (Kochanska, 2002) and their empathic concern in response to parental distress (Hastings et al., 2000; Kochanska, et al., 2010).

Results support the notion that children who comply with rules in the absence of supervision or surveillance, who feel empathic concern toward others’ distress, and who show regret and discomfort when they commit transgressions typically demonstrate positive developmental adaptation. In contrast, a lack of, or compromised development of guilt, conscience, and rule-governed behavior, appears to be central in the developmental pathway towards psychopathic traits (Frick & White, 2008), making these early behaviors useful targets of investigation to understand the emergence of psychopathic traits in preschool samples.

2.6.2. Overlap with emotion processing

A large body of literature supports the notion that children with emotion regulation difficulties are at risk of developing conduct problems (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Frick & Morris, 2004). General definitions of emotion regulation focus on the external and internal processes involved in initiating, maintaining, and modulating both intensity and expression of emotion (Eisenberg et al., 1997; Thompson, 1994). External processes refer to influences separate to the child, including parents or other socializing agents in their environment (Morris, Silk, Steinberg, & Aucoin, 2002). These external processes typically involve parents modeling appropriate emotion regulation and emotional expression, and providing emotional coaching or scaffolding (see Chapter 3). Internal processes refer to psychological processes within the child that enable management of emotions and include effortful control and passive internal processes. Effortful control is the ability to avoid situations that evoke emotional responses or ability shift attention away from emotion-eliciting stimuli. Passive internal processes are automatic responses to emotional stimuli, including sensitivity to positive
and negative emotional stimuli and signals of reward or punishment (Blair, 2003; Gray, 1982).

Effortful control and passive responses to emotional stimuli appear to be separate, but interacting, dimensions relevant to understanding the development of conduct problems. Furthermore, both dimensions support extending CU traits to very young samples of children. Individual differences in children’s autonomic physiological response to emotion-inducing stimuli emerge in the first year of life (Kagan, Reznick, & Snidman, 1988; 1990). Individual differences in effortful control emerge towards the end of the first year, but show developmental change throughout early childhood (Kochanska, Murray, & Coy, 1997). Variation in both dimensions, and in the way they interact, appears to contribute differentially to the development of conduct problems in children. A better understanding of effortful control and responsiveness to emotional stimuli could be useful to identify a subgroup of children with high levels of CU traits.

Emotion regulation problems are typically associated with conduct problems manifested through overt and angry confrontation with others (including fighting and defiance). This form of behavioral expression fits well with earlier definitions of reactive aggression in the context of perceived provocation (Section 2.4.5) and a DSM diagnosis of ODD (Section 2.4.3). In support of this premise, research has consistently demonstrated an association between high levels of negative emotional reactivity and conduct problems (e.g., Eisenberg et al., 2001; Morris et al., 2002). Furthermore, the association is supported by prospective longitudinal studies demonstrating that high levels of negative infant emotional reactivity (including anger and hostility) predicts conduct problems in childhood (Bates, Bayles, Bennett, Ridge, & Brown, 1991; Rothbart et al., 1994), and antisocial behavior and delinquency in adolescence (Caspi, 2000). In contrast, children with conduct problems and high levels of CU traits demonstrate a different pattern of emotional dysregulation, characterized by a
preference for novel and thrill-seeking activities (potentially to overcome low autonomic resting states), reduced responsivity to negative emotional cues of distress and fear, and effortful control problems relating to reduced attentional processing of salient emotional cues (see Section 4.5).

The importance of negative emotional arousal is a key part of Blair’s ‘Integrated Emotional Systems’ (IES) model (Blair, 2005), which utilizes a cognitive neurobiological approach to explain the development of psychopathy. Specifically, Blair focuses on identifying dysfunction at a neurobiological level and examines how this is manifested in behavioral or cognitive outcomes. As such, the theory is multidisciplinary, and attempts to specify behaviors, functional impairments, neural systems underpinning those impairments, and factors associated with the impairments at a molecular or genetic level.

Broadly, Blair has argued that the fundamental deficit at the heart of psychopathy is amygdala dysfunction, which hinders the development of ‘moral socialization’ or socialization via emotional learning. More specifically, hyporeactivity of the amygdala is hypothesized to produce deficits in recognition of fear and sadness, such that children are unable to associate actions that cause harm to another with that person feeling subsequent emotions of distress (see Section 2.5.4). In this way, Blair’s model builds on the writing of Lykken (1957) who proposed a ‘low fear hypothesis’ arguing that the impaired moral functioning of psychopaths results from a blunted ability to experience fear or anxiety. For example, being faced with a stimulus that would be aversive to most people (e.g., a crying or distressed child), children with CU traits appear less empathic because the negative reactions/emotions of others fails to make them feel the expected level of ‘punishment’. Over time therefore, violent and aggressive behavior towards others can continue unmodulated.
In the IES model, avoidance learning is particularly focused on negative emotional cues of distress of others rather than overt punishment from the environment, a distinction that is not trivial. However, recent findings from investigations of the ventromedial prefrontal cortex have implications for how other aspects of reward and punishment from the environment could be incorporated into the model. Specifically, abnormalities in various regions of the prefrontal cortex are also hypothesized to give rise to some of the cognitive and behavioral characteristics associated with psychopathy, including reduced passive avoidance learning or failures in response reversal tasks, although these deficits may occur downstream of dysfunction of the amygdala. As such, while the processing of negative emotional cues of distress versus experiencing reward/punishment responses may be underpinned by separate neurological systems, it appears that young children with emerging psychopathic-like behaviors may manifest dysfunction in both systems.

A related area of research has focused on the finding that low levels of fear are associated with conduct problems both concurrently (Eisenberg et al., 2001; Frick et al., 2003b) and prospectively (Shaw et al., 2003). It has been proposed that a lack of fearful inhibitions or ‘fearlessness’ makes is difficult for children to develop a capacity for empathy or guilt, leaving them at risk of developing CU traits or more severe forms of antisocial behavior (Frick & Morris, 2004; Lykken, 1957). This premise is supported by the finding that relatively fearful children show higher levels of conscience development than other children in cross-sectional (Kochanska et al., 2002) and prospectively longitudinal designs (Rothbart et al., 1994), and using both behavioral and psychophysiological measures of fearfulness. Kochanska and colleagues (Kochanska, 1993; 1995; 1997; Kochanska et al., 2002, 2005) have therefore proposed that emotional arousal or fearfulness is an important part of conscience development and the internalization of social norms. In the model, arousal that is either too high or low (i.e.,
fearful or fearless children) impairs conscience development. An optimal level of arousal is proposed to occur through interaction between parent and child, and the style of parenting experienced.

In relation to the development of CU traits, Kochanska and colleagues have proposed that ‘fearlessness’ may render normal parental socialization techniques insufficient to produce the level of arousal needed for conscience development or internalization of parental norms. In support of this model, Cornell and Frick (2007) found that teacher- or parent- nominated fearfulness versus fearlessness in preschool children (aged 3-5 years old) interacted cross-sectionally with dimensions of parenting. Children who were fearful demonstrated higher levels of guilt, regardless of the consistency of parenting. In contrast, fearless children only showed higher levels of guilt if they experienced high parental consistency or high levels of authoritarian parenting.

Taking the models of Blair and Kochanska together, CU traits in very young children are likely to be associated with deficits in negative arousal following cues of punishment (or parental socialization techniques) and cues of distress (from others), which are likely to be underpinned by different neurobiological systems. In both cases, a child experiences diminished experience of transgression-related anxiety. As such, avoidance learning cannot happen. Specifically, the child fails to associate wrongdoing, moral transgressions, or causing harm to others with the experience of distress or punishment. A temperament characterized by these deficits makes the development of empathy and conscience more difficult and increases the likelihood of a child showing CU traits. In turn, deficits in empathy, guilt, and other aspects of conscience relating to CU traits make a child more likely to act aggressively (Jolliffe & Farrington, 2006; also see Section 2.5.4, which describes cognitive and socioemotional processing deficits in older children with CU traits). In the extension of psychopathy to very young samples
therefore, measurement efforts need to be driven by a search for valid behavioral and physiological indicators of these early emotional and cognitive processes. Within this search, a focus on the affective aspects of psychopathy may be particularly useful with younger samples.

2.6.3. Conclusions and implications

Few studies have assessed CU traits in very young, preschool-aged samples of children. This is surprising given that childhood behavior problems have been shown to have their roots in the preschool period (e.g., Shaw et al., 2003) and there is increasing recognition that psychopathology emerges early in life (see Angold & Egger, 2007). Evidence from developmental research demonstrates that very young children display behaviors related to conceptualizations of CU traits in older samples of children in adolescents. First, children as young as 18 months old demonstrate individual differences in their capacity for empathic concern for others (e.g., Baillargeon et al., 2007; Hay & Cook, 2007; Kochanska & Aksan, 2006; Zahn-Waxler et al., 1992). Second, preschool children show rapidly increasing prosociality and an ability to respond sensitively to the emotions of others (e.g., Borke, 1971; Eisenberg et al., 1999). Third, the distinction between reactive and proactive aggression, which is strongly related to the concept of CU traits, emerges as early as 18 months old (Hay et al., 2000) and may be a useful indicator of children at risk of CU traits or more severe forms of conduct problems because of its rarity (Carter et al., 2009). Fourth, children as young as 3 years old appear able to deceive others through lying, a strategy that involves both verbal and non-verbal deception, and an understanding of others’ theory of mind (e.g., Bussey, 1992, 1999; Chandler et al., 1989; Crossman & Lewis, 2006; Talwar & Lee, 2002; Wilson et al., 2003). Finally, a broad and multidisciplinary body of research has documented individual differences in preschool children’s experience of guilt and
discomfort and development of rule-governed behavior and conscience (e.g., Lewis et al., 1989; Kochanska & Aksan, 2006; Kochanska et al., 2010; Zahn-Waxler & Smith 1992).

In addition to this body of research, two developmental models have also incorporated findings from behavioral and neurobiological studies (Blair, 2003; Kochanska, 1993). These models both highlight the early emergence of individual differences in emotional arousal in response to negative cues from the environment, and specifically to displays of distress from others or to cues of punishment. While neither developmental model specifies the causes of a child having a fearless temperament or low emotional responsivity, it may be that this is due to a genetic predisposition (Viding et al., 2005; Viding, Jones, Frick, Moffitt, & Plomin, 2008). Speculatively, a genetic predisposition could underpin individual differences in amygdala reactivity to signals of distress (Blair, 2003), autonomic reactivity, emotion regulation, or ventromedial prefrontal cortex reactivity to cues of punishment and reward. It should be noted however, that genetic vulnerability does not preclude the role of social factors in the environment, and particularly parenting. Parenting could operate at a child-specific level as part of nonshared environmental influences (Viding, Fontaine, Oliver, & Plomin, 2009). Furthermore, given the deficits in emotional systems and reactivity associated with high levels of CU traits, dimensions of parental affect and affectively based measures of parent-child interactions may be particularly useful targets of future investigations (see Chapter 4, Sections 4.4.1 and 4.4.3).

Evidence therefore supports the hypothesis that meaningful differences emerge in behaviors that are conceptually related to CU traits from infancy. This notion is further supported by the results of studies investigating neurobiological differences in children with high versus low levels of CU traits, genetically informative studies, and fits with various developmental models of guilt and conscience. Therefore, there is
justification for this thesis to extend the construct of psychopathy to very young children. However, further investigation is needed to examine behaviors that are conceptually related to CU traits among preschool children. As such, this thesis will seek to develop a measure of CU behavior that focuses particularly on affective dimensions of psychopathy by assessing guilt, lack of response to punishment, low levels of prosociality, and a lack of expression of concern/feeling towards others (see Chapter 4, Section 4.4.1). In relation to ongoing debates in the adult and youth literature, the measure of CU behavior derived for the thesis for use with very young children would likely benefit from excluding traditional antisocial behavior or conduct problem items.

Finally, Chapter 2 also highlights the need for this thesis to examine different environmental influences that are important to the development of CU traits among children. While evidence suggests that CU traits are moderately stable across childhood and adolescence, mean-level and individual-level estimates also demonstrate that levels of CU traits fluctuate considerably, and are by no means immutable within samples of youth (e.g., Frick et al., 2003a; Fontaine et al., 2011). Indeed, this thesis seeks to investigate the possibility that CU-like behaviors in a younger sample of preschool children may demonstrate even greater instability. Identifying factors that contribute to both stability and change in CU traits over time is vital for prevention and intervention efforts for youth antisocial behavior. Developmental models of guilt, conscience, and empathy suggest that parenting may be a particularly useful target of investigation for very young children (e.g., Kochanska, 1995; 1997). Therefore, there is a need for better understanding of the association between dimensions of parenting and the development of CU traits across samples of youth.
Chapter 3: What are the associations between parenting, callous-unemotional traits, and antisocial behavior in youth? A systematic review of evidence
3.1. Introduction

3.1.1. Overview

Antisocial behavior causes harm to individuals, families, and communities, and is costly to society (Scott, et al., 2001; Welsh et al., 2008). In the most recent US Office of Juvenile Justice and Delinquency Prevention (OJJDP) report of 2008, young people accounted for 16% of all arrests for violent crime, and 26% of all arrests for property crime (Puzzanchera, 2009). Of 2.1 million youth arrested in 2008, 5% had committed violent crimes, including murder, rape, robbery, and assault. Furthermore, youth with early-starting and chronic trajectories of antisocial behavior are more likely to experience a range of adverse mental health outcomes as adults (e.g., Fergusson et al., 2005; Odgers et al., 2008). Developing well-evidenced etiological theories and identifying intervention targets therefore remain key research priorities in the study of antisocial behavior. Indeed, decades of research have focused on both dispositional child characteristics (e.g., self-regulation and temperament) and aversive environmental conditions (e.g., harsh parenting, poverty) that culminate in delinquent or antisocial behavior (see Loeber et al., 1998; Welsh et al., 2008).

At the same time, developmental psychopathology research has consistently highlighted significant heterogeneity in the cause, development, treatment responsiveness, and long-term outcomes between subgroups of antisocial youth (see Chapter 2, Section 2.4). In the last 15 years, there has been a focus on the presence of Callous-Unemotional (CU) traits among a subgroup of antisocial youth. CU traits are characterized by a lack of empathy and guilt, callousness, and proactive aggression towards others (Frick & White, 2008; Frick & Viding, 2009). A significant body of research has examined measurement of CU traits among youth, associated cognitive and
socioemotional characteristics, and the neurobiological and genetic profiles of antisocial youth with CU traits (Frick & White, 2008; see Chapter 2, Section 2.5). Furthermore, it has been proposed that CU traits be included as a specifier of Conduct Disorder (CD) in the forthcoming edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; Frick & Moffitt, 2010), making them an important clinical target. Indeed, it appears that this group appears to be significantly different from other antisocial youth, which has implications for causal theories of antisocial behavior and treatment/intervention possibilities.

Within this emerging literature, a key debate has focused on the malleability of CU traits. Studies have investigated whether parenting practices are related to the development of CU traits, whether parenting interventions for antisocial behavior are less effective for youth who have high levels of CU traits, and whether CU traits improve following parenting interventions. This chapter seeks to synthesize and evaluate findings from observational and intervention studies that have investigated associations between parenting, CU traits, and antisocial behavior in youth.

3.1.2. Callous-Unemotional traits: background and definitions

As reviewed in Chapter 2, psychopathy refers to a complex syndrome, which includes interpersonal, affective, and lifestyle traits, and identifies more severe and violent offenders (Hare, 1991). In recent years, its downward extension to youth has been dominated by a focus on interpersonal (e.g., deceitfulness and manipulativeness) and affective (e.g., shallow affect and lack of guilt) dimensions, which have most commonly been labeled callous-unemotional (CU) traits among youth (Frick, 2004; Frick, O’Brien, Wootton, & McBurnett, 1994) and represent the core emotional responding deficit identified by Cleckley (1976; see Chapter 2). The focus on CU traits among samples of youth is supported by research suggesting their presence designates a particularly high-
risk and more aggressive group of antisocial youth (also see Chapter 2, Sections 2.5.3 and 2.5.4).

First, CU traits are associated with particularly severe and stable patterns of antisocial behavior and aggression, in particular the use of proactive or instrumental aggressive strategies to obtain reward (e.g., Frick et al., 2003b; Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005). Second, experimental data suggest that youth with CU traits show a neurocognitive and socioemotional profile similar to adult psychopaths, including reduced responsivity to others’ distress (Blair et al., 2001a), insensitivity to punishment (Blair et al., 2001b), and a tendency to overestimate the positive outcomes associated with aggressive responses towards others (Pardini et al., 2003). Third, the antisocial behavior of youth with high versus low levels of CU traits appears to be more strongly genetically influenced (e.g., Viding, et al., 2005; Viding, et al., 2008). Further, CU traits are associated with differences in neural reactivity, including reduced amygdala responsivity to the distress of others (e.g., Jones, Laurens, Herba, Barker, & Viding, 2009; Marsh et al., 2008). Finally, CU traits appear to show moderate stability (e.g., Dadds et al., 2005; Obradovic et al., 2007).

However, studies have typically assessed preadolescent or adolescent samples of males using cross-sectional designs. These caveats limit the generalizability of findings and make it difficult to draw conclusions about causality. Studies investigating the stability of CU traits have also tended to assess adolescent males over short time intervals, and report higher stability when the same informant is used across assessments (Andershed, 2010). Furthermore, when studies investigate mean-level versus individual-level stability, or behavior trajectories, there are significant fluctuations in the level of CU traits (see Fontaine, et al., 2011; Frick et al., 2003a). Indeed, the question of how malleable CU traits are is a key focus of Chapter 3. At the same time, research into CU traits at young ages could help to identify children at risk
of severe antisocial behavior, and provide insight into risk/protective factors at a time when personality structure is still developing and may be most amenable to intervention.

3.1.3. Parenting: Theoretical and empirical links with child outcomes

Research over many decades has focused on the role of the early family environment and parenting practices in children’s development. Conceptualizations of effective parenting practices arose from the authoritative parenting model developed by Baumrind (e.g., Baumrind, 1991; Maccoby & Martin, 1983). Effective and positive parenting is theorized to incorporate scaffolding, (e.g., breaking behavior into small steps, prompting appropriate behavior, using clear and simple directives), contingent positive reinforcement (e.g., use of praise and incentives), monitoring (e.g., supervising young children’s activities and whereabouts) and positive involvement (e.g., providing youngsters with positive affective or loving attention) (e.g., Forgatch, Bullock, & Patterson, 2004; Forgatch & DeGarmo, 1999; Patterson, 1982; Patterson, Reid, & Dishion, 1992; Snyder & Stoolmiller, 2002).

A large body of evidence supports the idea that high quality parenting in childhood, characterized by warmth, involvement, and sensitivity predicts a range of positive socioemotional and cognitive outcomes in early and middle childhood (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2000; Maccoby & Martin, 1983; National Institute of Child Health and Human Development Early Child Care Research Network, NICHD ECCRN, 2002; NICHD ECCRN, 2004). In addition, provision of a stimulating and structured environment, and proactive or involved parenting practices have also been shown to contribute to the development of social, emotional, and academic competencies (e.g., Brooks-Gunn & Markman, 2005; Gardner, et al., 2003; NICHD ECCRN, 2005; Pettit, Bates, & Dodge, 1997; Patterson, Reid, &
Dishion, 1992). Further, numerous randomized trials attest to the potential causal influence of these parenting strategies for child outcomes (e.g., Dishion et al. 2008; Gardner, Burton, & Klimes, 2006; Furlong et al., 2012).

In contrast, harsh and ineffective parenting practices, characterized by verbal abuse (e.g., yelling, belittling, or threatening), physical abuse (e.g., spanking or slapping), or displays of negative emotionality or aggression by a parent predict poor outcomes during childhood and adolescence (Maccoby, 2000; Shaw et al., 2003; Tremblay, 2004). In particular, children who experience over-reactive, irritable, angry, or neglecting parenting are at risk of developing more severe forms of externalizing or antisocial behavior. Studies also highlight the importance of reciprocal associations between negative parent and child behaviors, which lead to increasingly coercive and harsh exchanges (e.g., Larsson, Viding, Rijsdijk, & Plomin, 2008b; Patterson, 1982; Scaramella, Neppl, Ontai, & Conger, 2008). Into adolescence, negative parenting dimensions, including poor monitoring or supervision and lack of parental involvement have also been shown to contribute to increasing levels of antisocial or delinquent behavior (e.g., Dishion & Patterson, 2006; Dishion & Stormshak, 2007; Loeber, et al., 1998).

3.1.4. Parenting: Theoretical and empirical links with CU traits

Research over many decades therefore highlights the important of parenting to children’s development, incorporating both positive behavior trajectories and antisocial, delinquent, or aggressive behavioral outcomes. However, a key question that emerged in Chapter 2 relates to the extent of any association between dimensions of parenting and the development of CU traits among children and adolescents. On one hand, children with CU traits are thought to be less susceptible to parental socialization and discipline efforts (e.g., Oxford, Cavell, & Hughes, 2003). Specifically, CU traits are
hypothesized to produce an attenuated response to punishment cues or the distress of others following behavioral transgressions (also see Chapter 2, Section 2.6.2). Failure to make these associations appears to disrupt the development of empathy and moral socialization, thereby increasing the likelihood of aggressive behavior (Blair et al., 2006; Kochanska, 1997). On the other hand, there is evidence that parental harshness and low warmth are related to CU traits (Frick, et al., 2003; Pardini, Lochman, & Powell, 2007). Harsh punishment is thought to elicit high levels of arousal, making it difficult for children to internalize parental messages about prosocial behavior (Pardini et al., 2007). In contrast, parental warmth and responsiveness may work against the development of antisocial behavior by promoting empathy prosociality, particularly in children with fearless temperaments (Kochanska, 1997).

However, developing a precise understanding of how parenting, CU traits, and antisocial behavior are related in youth has been hampered by studies testing markedly different research questions via different designs, in varying samples, and using a range of assessment methods. Chapter 3 aims to synthesize results of studies that have investigated various associations between parenting, CU traits, and antisocial behavior. Specifically, Chapter 3 is a review that examines several questions, including (a) whether parenting is related to CU traits, (b) whether parenting interventions for antisocial behavior are effective for youth with CU traits, and (c) whether there are developmental differences in the extent or type of associations between parenting, CU traits, and antisocial behavior.
3.2. Methods

3.2.1. Search strategy

Chapter 3 was based on a systematic search of eight databases, including MEDLINE, PsycINFO, and Dissertations and Theses Abstracts. The search strategy combined terms to identify studies investigating CU traits and dimensions of parenting among youth:

(adolescen^* OR boy^* OR child^* OR girl^* OR infant^* OR juvenile^* OR preadolescen^* OR pre-adolescen^* OR preschool^* OR pre-school^* OR schoolchild^* OR toddler^* OR teen^* OR young OR youth) AND (callous^* OR psychopathy OR psychopathic OR psychopath OR sociopath^* OR unemotional) AND (caregiver^* OR famil^* OR father^* OR maternal OR mother^* OR parent^* OR paternal). In addition, the references of several review papers were hand-searched (Frick & White, 2012; Munoz & Frick, 2012; Viding & McCrory, 2012). Web-based searches via Google and Google Scholar were also carried out. Finally, four experts in the field were contacted to ensure that all relevant, and potentially unpublished, literature had been located (P. Frick, D. Pardini, R. McMahon, & E. Viding; personal communication, March 2012).

No date, publication, or language restrictions were imposed. Abstracts of identified articles were screened for the following inclusion criteria: (a) presentation of data testing cross-sectional or longitudinal associations between parenting, CU traits, and antisocial behavior using validated or previously published measures of parenting and CU traits; (b) assessment of a youth sample with an upper age range of 18 years old, from community, school, clinic, or research settings. Treatment studies meeting these criteria were retained if, (a) treatment focused on changing parenting behavior or parent-child interactions; (b) CU traits were tested as an outcome or moderator of
effectiveness. No restrictions were placed on design, except that studies relying on youth retrospective reports of parenting were excluded.

### 3.2.2. Identified studies

The search identified 2606 records. First, titles and abstracts of all identified records were screened. Studies were retained for further inspection if they corresponded to the aims of the review. From there, the full texts of 64 potentially relevant studies were examined to assess whether they met the inclusion criteria of the review. After inspecting these 64 papers, 34 were removed (typically, these did not assess parenting or CU traits). Several studies investigating moderation of the effectiveness of non-parenting interventions by CU traits (e.g., Waschbusch, Carrey, Willoughby, King, & Andrade, 2007a) or treatment of incarcerated psychopathic youth (e.g., Caldwell, Skeem, Salekin, & Van Rybroek, 2006) were identified but not retained. Two studies that relied on retrospective reports of parenting by incarcerated adolescents (Edens, Skopp, & Cahill, 2008; Fritz, Ruchkin, Kaposov, & Klinteberg, 2008) were excluded because of the difficulty of obtaining reliable reports of parenting from this type of sample. The final pool of 30 studies comprised 26 different samples, and included research published between 1997 and 2013 and one unpublished dissertation.

Table 6 summarizes study characteristics. Of the 30 included studies, 12 were longitudinal, 10 were cross-sectional, and 8 investigated parenting interventions for antisocial behavior. All but three studies were carried out in the US, UK, or Australia. To clarify associations between parenting, CU traits, and youth antisocial behavior, five research questions were identified among studies (Figure 2a-e; note Figures 2f and 2g are suggested future designs, see Section 3.4): (a) Does parenting directly predict level of youth CU traits? (b) Does parenting predict youth antisocial behavior at different levels of CU traits? (c) Does parenting differ between subgroups of youth categorized
according to their level of antisocial behavior and CU traits? (d) Do parenting interventions directly reduce the level of youth CU traits? (e) Do CU traits moderate or predict the effectiveness of parenting interventions for youth antisocial behavior?
Figure 2: Summary of study designs included in review (a-e) and suggested future designs (f & g)

a) Does parenting directly predict level of youth CU traits?

```
Parenting ➔ CU traits
```

b) Does parenting predict antisocial behavior regardless of the level of youth CU traits?

```
Parenting ➔ CU traits
```


c) Does parenting differ between subgroups of youth categorized according to level or trajectory of antisocial behavior (antisocial behavior) and CU traits?

```
Parenting ➔ AB+CU+ vs. AB+CU- vs. AB-CU+ vs. AB-CU-
```

d) Do parenting interventions directly reduce the level of youth CU traits?

```
Intervention ➔ Parenting ➔ CU traits
```

e) Do CU traits predict or moderate effectiveness of parenting interventions for youth antisocial behavior?

```
CU traits ➔ Parenting ➔ Intervention ➔ CU traits
```

f) Do parenting interventions simultaneously reduce level of youth CU traits and antisocial behavior?

```
Intervention ➔ Parenting ➔ Antisocial behavior ➔ CU traits
```

g) Do interventions that target specific dimensions of parenting uniquely reduce level of youth CU traits versus antisocial behavior?

```
Intervention ➔ Parenting ➔ dimension A ➔ dimension B ➔ CU traits ➔ Antisocial behavior
```
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample size</th>
<th>Type of sample</th>
<th>% female</th>
<th>Age range (years)</th>
<th>Ethnicity</th>
<th>Measure of parenting</th>
<th>Measure of CU traits</th>
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<td><strong>Longitudinal studies</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
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<td>Barker et al. (2011)</td>
<td>UK</td>
<td>6673</td>
<td>Representative</td>
<td>43</td>
<td>2, 4 &amp; 13</td>
<td>Mixed, majority Caucasian</td>
<td>Questionnaire (P)</td>
<td>6-item questionnaire, CU traits</td>
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<td>9578</td>
<td>Representative</td>
<td>53</td>
<td>4, 7, &amp; 12</td>
<td>Predominantly Caucasian</td>
<td>Questionnaire (P)</td>
<td>3 CU items, APSD; 4 prosocial items, SDQ (T)</td>
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<td>USA</td>
<td>98</td>
<td>Aggressive</td>
<td>47</td>
<td>8-12</td>
<td>Mixed, majority Caucasian</td>
<td>APQ &amp; questionnaire (P&amp;Y)</td>
<td>6 CU items, APSD (PT&amp;Y)</td>
</tr>
<tr>
<td>Hawes et al. (2011)</td>
<td>Aus</td>
<td>1008</td>
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<td>47</td>
<td>3-10</td>
<td>Predominantly Caucasian</td>
<td>APQ (P)</td>
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<td>98</td>
<td>Aggressive</td>
<td>47</td>
<td>8-12</td>
<td>Mixed, majority Caucasian</td>
<td>APQ (P&amp;Y)</td>
<td>6 CU items, APSD (PT)</td>
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<td>1233</td>
<td>High-risk</td>
<td>100</td>
<td>7-8</td>
<td>Mixed, majority African-American</td>
<td>Questionnaire (P)</td>
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<td>Representative</td>
<td>47</td>
<td>3-4</td>
<td>Predominantly Caucasian</td>
<td>Questionnaire (P)</td>
<td>3 CU items, APSD; 4 prosocial items, SDQ (T)</td>
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<td>98</td>
<td>Aggressive</td>
<td>47</td>
<td>12-16</td>
<td>Mixed, majority Caucasian</td>
<td>APQ (P)</td>
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<td>506</td>
<td>High-risk</td>
<td>0</td>
<td>13-14</td>
<td>Mixed, majority African-American</td>
<td>Questionnaire (P)</td>
<td>8 items, IC questionnaire (P)</td>
</tr>
<tr>
<td>Pardini et al. (2007)</td>
<td>USA</td>
<td>120</td>
<td>Aggressive</td>
<td>41</td>
<td>9-12</td>
<td>Mixed, majority African-American</td>
<td>APQ &amp; questionnaire (P&amp;Y)</td>
<td>6 CU items, APSD (PT)</td>
</tr>
<tr>
<td>Viding et al. (2009)</td>
<td>UK</td>
<td>4508</td>
<td>Representative</td>
<td>54</td>
<td>7, 12</td>
<td>Mixed, majority African-American</td>
<td>Questionnaire (P)</td>
<td>3 CU items, APSD; 4 prosocial items, SDQ (P&amp;T)</td>
</tr>
<tr>
<td>Waller et al. (2012b)</td>
<td>USA</td>
<td>731</td>
<td>High-risk</td>
<td>49</td>
<td>2, 3, 4</td>
<td>Mixed, majority Caucasian</td>
<td>Observed &amp; questionnaire (P)</td>
<td>5 items, DC behavior questionnaire (P)</td>
</tr>
<tr>
<td><strong>Cross-sectional studies</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Enebrink et al. (2005)</td>
<td>Swe</td>
<td>41</td>
<td>Clinic-referred</td>
<td>0</td>
<td>6-13</td>
<td>Predominantly Caucasian</td>
<td>Interviews &amp; case records (P&amp;A)</td>
<td>6 CU items, APSD (P)</td>
</tr>
<tr>
<td>Falk &amp; Lee (2011)</td>
<td>USA</td>
<td>208</td>
<td>Clinic-referred</td>
<td>30</td>
<td>6-9</td>
<td>Mixed, majority Caucasian</td>
<td>APQ (P)</td>
<td>6 CU items, APSD (P)</td>
</tr>
<tr>
<td>Hipwell et al. (2007)</td>
<td>USA</td>
<td>990</td>
<td>High-risk</td>
<td>100</td>
<td>7-8</td>
<td>Mixed, majority African-American</td>
<td>Questionnaire (P)</td>
<td>4 CU items, APSD (PT)</td>
</tr>
<tr>
<td>Koglin &amp; Petermann</td>
<td>Lux</td>
<td>177</td>
<td>Representative</td>
<td>50</td>
<td>5-7</td>
<td>Mixed, majority African-American</td>
<td>APQ (P)</td>
<td>6 CU items, APSD (P)</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Sample Size</td>
<td>Informant</td>
<td>Age Range</td>
<td>Ethnicity</td>
<td>Measure(s)</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------</td>
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<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Loney et al. (2008)</td>
<td>USA</td>
<td>83</td>
<td>Representative</td>
<td>53</td>
<td>Mixed, majority Caucasian</td>
<td>APQ (P)</td>
<td>6 CU items, APSD (PT)</td>
<td></td>
</tr>
<tr>
<td>Loney et al. (2007b)</td>
<td>USA</td>
<td>83</td>
<td>Representative</td>
<td>53</td>
<td>Mixed, majority Caucasian</td>
<td>APSD (PT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasalich et al. (2011b)</td>
<td>Aus</td>
<td>95</td>
<td>Clinic-referred</td>
<td>0</td>
<td>Predominantly Caucasian</td>
<td>Observed &amp; speech samples coding (O&amp;P)</td>
<td>3 CU items, APSD; 4 prosocial items, SDQ (PTY)</td>
<td></td>
</tr>
<tr>
<td>Vitacce et al. (2003)</td>
<td>USA</td>
<td>136</td>
<td>Representative</td>
<td>100</td>
<td>Hispanic</td>
<td>APQ (Y)</td>
<td>6 CU items, APSD (Y)</td>
<td></td>
</tr>
<tr>
<td>Wootton et al. (1997)</td>
<td>USA</td>
<td>166</td>
<td>Clinic-referred</td>
<td>24</td>
<td>Predominantly Caucasian</td>
<td>APQ (P)</td>
<td>6 CU items, PSD (PT)</td>
<td></td>
</tr>
<tr>
<td>Yeh et al. (2011)</td>
<td>USA</td>
<td>1210</td>
<td>Representative</td>
<td>52</td>
<td>Mixed, majority Caucasian</td>
<td>Parent affect questionnaire (Y)</td>
<td>CPS (P)</td>
<td></td>
</tr>
</tbody>
</table>

### Treatment/intervention studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Informant</th>
<th>Age Range</th>
<th>Ethnicity</th>
<th>Measure(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawes &amp; Dadds (2005)</td>
<td>Aus</td>
<td>49</td>
<td>Clinic-referred</td>
<td>0</td>
<td>Nr</td>
<td>Observed &amp; questionnaire (O&amp;P)</td>
<td>3 CU items, APSD; 4 prosocial items, SDQ (P)</td>
</tr>
<tr>
<td>Hawes &amp; Dadds (2007)</td>
<td>Aus</td>
<td>49</td>
<td>Clinic-referred</td>
<td>0</td>
<td>Nr</td>
<td>Observed &amp; questionnaire (O&amp;P)</td>
<td>3 CU items, APSD; 4 prosocial items, SDQ (P)</td>
</tr>
<tr>
<td>Hyde et al. (2013)</td>
<td>USA</td>
<td>731</td>
<td>High-risk</td>
<td>49</td>
<td>Mixed, majority Caucasian</td>
<td>Observed &amp; questionnaire (P)</td>
<td>5 items, DC behavior questionnaire (P)</td>
</tr>
<tr>
<td>Kolko &amp; Pardini (2010)</td>
<td>USA</td>
<td>177</td>
<td>Clinic-referred</td>
<td>19</td>
<td>Mixed, majority Caucasian</td>
<td>na</td>
<td>6 CU items, APSD (T)</td>
</tr>
<tr>
<td>Kolko et al. (2009)</td>
<td>USA</td>
<td>139</td>
<td>Clinic-referred</td>
<td>15</td>
<td>Mixed, majority Caucasian</td>
<td>na</td>
<td>6 CU items, APSD (T)</td>
</tr>
<tr>
<td>McDonald et al. (2011)</td>
<td>USA</td>
<td>66</td>
<td>High-risk</td>
<td>nr</td>
<td>Mixed, majority Caucasian</td>
<td>Questionnaire (P)</td>
<td>16-item total PSD (P)</td>
</tr>
<tr>
<td>Somech &amp; Elizur (2012)</td>
<td>Israel</td>
<td>209</td>
<td>High-risk</td>
<td>20</td>
<td>Predominantly Israeli</td>
<td>APQ-Revised (P)</td>
<td>3 CU items, APSD; 8 items, ICU (P)</td>
</tr>
<tr>
<td>White (2010); White et al. (2012)</td>
<td>USA</td>
<td>134</td>
<td>Clinic-referred</td>
<td>28</td>
<td>Mixed, majority African-American</td>
<td>APQ (P&amp;Y)</td>
<td>ICU (Y)</td>
</tr>
</tbody>
</table>

Note. For informant on measures: P, parent; Y, youth; T, teacher; PT, combination of parent and teacher; PC, combination of parent and child; O, observed; A, alternative approach. APSD, Antisocial Process Screening Device; APQ, Alabama Parenting Questionnaire; CPS, Child Psychopathy Scale; DC, deceitful-callous behavior; IC, Interpersonal Callousness; ICU, Inventory of Callous-Unemotional Traits; PCL-YV, Psychopathy Checklist-Youth Version; PSD, Psychopathy Screening Device. For longitudinal studies, age range reported for first assessment, or for age at outcome (if relevant).
Given the distinct research questions addressed across studies, range of analytic techniques, and heterogeneous measurement approaches, meta-analysis was not feasible. For the purposes of Chapter 3, studies were therefore reviewed in a narrative synthesis according to: (a) research question; (b) age of youth based on mean age of sample and given retained studies had an upper age range of 18 years (early childhood/preschool, 3-6 years; middle/late childhood, 7-12 years; adolescence, 13-18 years). Several studies examined more than one research question, and therefore appear in multiple sections of the review. A summary of the main findings and key limitations for each study is presented in Table 2.2. Studies were systematically and critically appraised for methodological limitations according to: (a) sample size; (b) type of sample (e.g., community vs. clinic-referred; male vs. female); (c) measurement of CU traits; (d) measurement of parenting.

3.3. Results

3.3.1. Risk of bias of included studies (see Table 7)

Within longitudinal studies, sample sizes tended to be large (8 studies with $N > 500$), whereas within cross-sectional studies, sample sizes were smaller (8 studies with $N < 200$). In several cross-sectional studies, sample sizes were very small ($N < 100$). Treatment studies also tended to have small sample sizes (7 studies, $N < 200$). The risk of reduced generalizability of findings due to small samples, particularly for cross-sectional and treatment studies, needs to be considered alongside results. Within the 12 longitudinal studies, 5 examined community samples with equal numbers of males and females, which were also reported as reflecting the ethnicity of the general population. The remaining seven studies assessed at-risk or aggressive youth, and tended to
comprise majority Caucasian or African-American participants, but with other ethnicities represented. One longitudinal study assessed only females (Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011) and another, only males (Pardini & Loeber, 2008). In general, because of size and type of sample, longitudinal studies appear to have greater generalizability. Within cross-sectional studies, five were clinic-referred or aggressive samples, and were either all or majority male. Necessarily, treatment studies assessed clinic-referred or adjudicated samples, and three intervention studies were conducted using high-risk youth within community settings. Nevertheless, with one exception (Hyde et al., 2013), intervention studies assessed majority/exclusively male samples.

Across the 30 studies, 24 used the Antisocial Process Screening Device (APSD; Frick & Hare, 2002) or its predecessor, the Psychopathy Screening Device (PSD), to assess CU traits. The APSD is a 20-item measure, which includes a 6-item CU traits subscale. It has been validated across different formats, including parent and teacher rating and self-report scales. Nevertheless, there are various well-documented drawbacks of the CU traits subscale of the APSD, including the small number of items (n = 6), poor internal consistency of subscales, and limited range of response options (n = 3), which reduces the variance of scores obtained (Kotler & McMahon, 2010). Despite these limitations, the fact that so many studies used the APSD to assess CU traits enables greater comparability of results.

Of the six studies that did not use the APSD, two assessed ‘deceitful-callous behavior’ in the same sample of preschool children (Hyde et al., 2013; Waller et al., 2012b), one assessed ‘interpersonal-callousness’ in adolescents (Pardini & Loeber, 2008; Pardini, Obradovic, & Loeber, 2006), one used a modified version of the Child Psychopathy Scale (CPS; Lynam & Gudonis, 2005) to assess psychopathy in middle childhood (Yeh, Chen, Raine, Baker, & Jacobson, 2011), and one used a CU traits scale
similar to the APSD (Barker, Oliver, Viding, Salekin, & Maughan, 2011). Several studies (e.g., Viding, et al., 2009; Hawes & Dadds, 2005) used three of the APSD CU traits items, and combined them with four (negatively correlating) items of the Prosocial Behavior subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Many of these alternatives are therefore ‘home-grown’ measures comprising questionnaire items within studies that did not originally set out to measure CU traits (also see Chapter 2, Section 2.5.1). Finally, White (2010)\textsuperscript{4} assessed CU traits among adjudicated adolescents using the Inventory of Callous-Unemotional traits (ICU; Frick, 2004). Somech and Elizur (2012) also used items from the preschool ICU combined with APSD items.

Across all 30 studies, 23 used parent report to assess CU traits. Of these 23 studies, 13 relied solely on parent report and the remaining 10 combined parent ratings with teacher or child ratings (or both). Commonly, this approach involved summing parent and teacher ratings at an item level or creating a best estimate score, which combines ratings by using the higher score from reporters for each item. In an alternative approach, scores were obtained by calculating the proportion of reporters who classified the child as high on CU traits (Pasalich, Dadds, Hawes, & Brennan, 2011b). The use of the best estimate approach helps incorporate multiple informants, provides a cross-context assessment of behavior, may increase validity, and is thus favored in some studies (also see Chapter 2; Section 2.5.1). However while there are advantages to this approach, it also leads to loss of scale- and item-level information. Likewise, while cut-off scores are used in various studies, the validity of a ‘high’ versus ‘low’ distinction for CU traits among youth is yet to be established. To retain scale- and

\textsuperscript{4} A peer-reviewed/published version has recently become available (White, Frick, Lawing, & Bauer, 2012). The published version of the paper does not include analyses using parenting measures, which were included in the original dissertation (White, 2010). However, the published paper includes useful analytic approaches for examining change in CU traits and AB scores. As such, both are referenced.
item-level information, future studies could also create latent variable scores, which combine parent-, teacher-, and self-reports, and could even incorporate official reports, including court records (see Trentacosta, Hyde, Shaw, & Cheong, 2009). This approach could help to get around the low-moderate correlations often obtained between parent and teacher reports of child behavior. Finally, seven of the 30 reviewed studies provided no data on the internal consistency of their CU traits measure. Of the 23 studies that did provide Cronbach’s alphas, 10 were reported as being < .70, and, in some cases, as low as .40, which is a threat to the validity of measures and highlights the need for continued investigation of the construct of CU traits among youth samples.

In the measurement of parenting, 13 of the 30 studies assessed dimensions of parenting using the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996) and in 12 of these 13 studies, parent report on the APQ was used exclusively. Two treatment studies of the same sample (Kolko et al., 2009, Kolko & Pardini, 2010) did not measure parenting, but are retained in the review because parenting was the focus of treatment modules. Among studies that did not use the APQ, parent report on a questionnaire was still the most common method. However, although commonly employed and relatively inexpensive, parent report is subject to the well-known threats to validity associated with self-report methods, including social desirability effects or difficulties interpreting the meaning of items relating to parenting constructs (e.g., time-out or proactiveness) (Morsbach & Prinz, 2006). Furthermore, there may be problems relying on the use of parent reports of parenting behavior when parents have been involved in a parenting intervention (e.g., Hawes & Dadds, 2005). These limitations need to be considered alongside findings of studies that relied solely on parent-reported measures. Depending on the research question being asked or construct being assessed, direct observation of parenting is a potentially stronger
alternative, or complement, to parent-reports of parenting, taking advantage of assessing naturally occurring parenting behavior, using relatively unbiased observers.

In five included studies, parenting was assessed via observation, which strengthens the conclusions that can be drawn about the association between parenting and CU traits, especially if used to corroborate the results obtained using parent-reported measures. Observational methods, however, are also not immune from threats to validity, including observer reactivity by parents or inadequate sampling of behavior (Gardner, 2000). As such, it may be helpful to consider the dimension of parenting being assessed, the age and type of sample, and by extension, which method is most appropriate to provide a valid assessment of parenting (i.e., whether the parenting dimension being assessed is readily observable or better assessed using youth- or parent-report). At the same time, in 11 studies, no data was provided about the internal consistency of the parenting measure, and in 14 studies, parenting measures had alphas of < .70, which undermines the validity of measures.
Table 7: Results and major risks of bias of studies included in Chapter 3 presented according to research question/design (see Figure 2)

<table>
<thead>
<tr>
<th>Study</th>
<th>Key findings relevant to aims of Chapter 2</th>
<th>Main methodological limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barker et al. (2011)†</td>
<td>Harsh parenting at age 4 predicted boys’ CU traits at age 13.</td>
<td>Measures all parent report; no alpha reported for CU traits measure</td>
</tr>
<tr>
<td>Frick et al. (2003a)†</td>
<td>Youth and parent reports of negative parenting partially correlated with CU traits 4 years later.</td>
<td>Small sample size; selected to over represent youth with CP</td>
</tr>
<tr>
<td>Hawes et al. (2011)</td>
<td>Parental positive reinforcement, poor monitoring/supervision, involvement predicted CU traits</td>
<td>Measures all parent report</td>
</tr>
<tr>
<td>Loney et al. (2007b)</td>
<td>Parenting dysfunction mediated association between maternal psychopathy and CU traits</td>
<td>Reliance on parent report; no alphas reported</td>
</tr>
<tr>
<td>Pardini &amp; Loeber (2008)</td>
<td>Poor parent-child communication predicted higher initial and final levels of CU traits</td>
<td>CU traits measure from archived parent-reported items; male sample</td>
</tr>
<tr>
<td>Pardini et al. (2007)†</td>
<td>Parent-reported punishment and child-reported parental involvement predicted CU traits</td>
<td>Low alpha for measure of corporal punishment (.29)</td>
</tr>
<tr>
<td>Viding et al. (2009)</td>
<td>Negative parental discipline predicted CU traits but not MZ twin differences in CU traits</td>
<td>Low alphas for measures of negative parental discipline and CU traits</td>
</tr>
<tr>
<td>Vitacco et al. (2003)</td>
<td>Poor monitoring and inconsistent discipline not related to CU traits</td>
<td>All female, Hispanic sample; youth report only; no alphas reported</td>
</tr>
<tr>
<td>Waller et al. (2012b)</td>
<td>Observed and parent-reported harshness (not observed positive parenting) predicted CU traits.</td>
<td>Low alpha for CU traits measure at ages 2 (.57) and 3 (.64)</td>
</tr>
</tbody>
</table>

b) Does parenting predict youth antisocial behavior at different levels of CU traits?

<table>
<thead>
<tr>
<th>Study</th>
<th>Key findings relevant to aims of Chapter 2</th>
<th>Main methodological limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falk &amp; Lee (2011)</td>
<td>In 1/8 models tested, lower positive parenting predicted CD symptoms at low CU traits.</td>
<td>Reliance on parent report.</td>
</tr>
<tr>
<td>Hipwell et al. (2007)</td>
<td>CP associated with harsh punishment and low parental warmth at low levels of CU traits</td>
<td>4 items only for CU traits measure; low alpha (.60); all female sample</td>
</tr>
<tr>
<td>Hyde et al. (2013)†</td>
<td>CU traits-parenting interaction did not predict growth in CP from ages 2-4.</td>
<td>Low-moderate alpha for CU traits measure at age 3 (.64)</td>
</tr>
<tr>
<td>Koglin &amp; Petermann (2008)</td>
<td>Inconsistent discipline associated with boys’ aggressive behavior at low levels of CU traits.</td>
<td>Measures all parent report; no alphas reported</td>
</tr>
<tr>
<td>Kroneman et al. (2011)</td>
<td>Low parental warmth predicted higher initial levels of CD/ODD and faster decreasing levels of CD/ODD over five years at high levels of CU traits.</td>
<td>Measures all comprised parent report; low alpha for measurement of CU traits (.60); female sample</td>
</tr>
<tr>
<td>Muñoz et al. (2011)</td>
<td>For low CU traits group, higher parental control predicted knowledge, and higher solicitation predicted control and less knowledge led to increased parental control</td>
<td>Small sample; large age range; selected to over represent youth with CP; only one year follow-up</td>
</tr>
<tr>
<td>Pardini et al. (2007)†</td>
<td>CU traits-parenting interactions did not predict antisocial behavior one year later</td>
<td>Low alpha for measure of corporal punishment (.29)</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Sample Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Pasalich et al. (2011b)</td>
<td>CS</td>
<td>Small, clinic-referred sample with large age range</td>
</tr>
<tr>
<td>Wootton et al. (1997)</td>
<td>CS</td>
<td>Small, clinic-referred sample; large age range; parent report</td>
</tr>
<tr>
<td>Yeh et al. (2011)</td>
<td>CS</td>
<td>Low alphas for measurement of negative parental affect (male, .53; female, .60)</td>
</tr>
</tbody>
</table>

c) Does parenting differ between subgroups of youth categorized according to their level of antisocial behavior and CU traits?

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Sample Description</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barker et al. (2011)†</td>
<td>L</td>
<td>Parent report for all measures; no alpha reported for CU traits measure</td>
<td>AB+CU+ versus AB-CU- experienced harsher parenting and lower warmth. AB+CU+ versus AB+CU- had higher maternal psychopathology, negative feelings and harsher parenting.</td>
</tr>
<tr>
<td>Enebrink et al. (2005)</td>
<td>CS</td>
<td>Very small, clinic-referred sample of males</td>
<td>AB+CU+ versus AB+CU- experienced poorer home circumstances and more family stress.</td>
</tr>
<tr>
<td>Fontaine et al. (2011)</td>
<td>L</td>
<td>Population-based sample of twins; very small % of sample in some joint trajectory groups</td>
<td>AB+CU+ versus AB- CU- experienced more negative parental feelings and harsh discipline. AB+CU increasing had more family and parenting risk factors.</td>
</tr>
<tr>
<td>Frick et al. (2003a)†</td>
<td>L</td>
<td>Very small subgroups; large age range; over-selected sample for CP</td>
<td>Stable CU+ youth had lower levels of youth-reported positive parenting and higher CP.</td>
</tr>
<tr>
<td>Kimonis et al. (2004)</td>
<td>L</td>
<td>Small sample, large age range; over-selected sample for CP; reliance on parent report for measures</td>
<td>AB+CU+ and AB-CU- versus AB-CU- and AB+CU- experienced lower parent-reported monitoring/supervision and youth-reported parental involvement.</td>
</tr>
<tr>
<td>Larsson et al. (2008a)</td>
<td>L</td>
<td>Population-based sample of twins; harsh parental discipline had low alpha at ages 3 (.59), 4 (.56) and 7 (.56).</td>
<td>AB+CU+ and AB-CU- groups had higher levels of negative parental feelings and harsh parental discipline at ages 3, 4, and 7. Controlling for earlier CP made this non-significant.</td>
</tr>
</tbody>
</table>

d) Do parenting interventions have a direct effect on the level of youth CU traits?

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Sample Description</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawes &amp; Dadds (2007)</td>
<td>T</td>
<td>No control group; very small sample; male only; all parent reported</td>
<td>Pre- and post-treatment changes in CU traits.</td>
</tr>
<tr>
<td>McDonald et al. (2011)†</td>
<td>I</td>
<td>Low alpha for CU traits (.34); small sample; reliance on parent-report</td>
<td>Reductions in CU traits in treatment group and mediated through improved parenting.</td>
</tr>
<tr>
<td>Kolko et al. (2009)</td>
<td>T</td>
<td>No control group; multiple treatment components; males only</td>
<td>Reductions in CU traits shown in both treatment arms across 3-year follow-up.</td>
</tr>
<tr>
<td>Somech &amp; Elizur (2012)</td>
<td>T</td>
<td>Attrition; measures all parent report; male dominated sample</td>
<td>Reductions in CU traits in treatment group, maintained at 1 year follow-up.</td>
</tr>
</tbody>
</table>

e) Do CU traits moderate or predict the effectiveness of parenting interventions for youth AB?

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Sample Description</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawes &amp; Dadds (2005)</td>
<td>T</td>
<td>No control group; very small sample; male only; all parent reported</td>
<td>CU traits associated with increased likelihood of ODD diagnosis after treatment.</td>
</tr>
<tr>
<td>Hyde et al. (2013)†</td>
<td>I</td>
<td>Many children did not have existing behavior problems</td>
<td>Age 3 CU traits did not moderate intervention effectiveness.</td>
</tr>
<tr>
<td>Kolko &amp; Pardini (2010) T</td>
<td>Teacher reports of CU traits did not predict treatment outcome but parent reports of ‘hurtfulness’ did.</td>
<td>No control group; majority male sample; many treatment components</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>White (2010); White et al. (2012) T</td>
<td>FFT effective and high CU traits had better outcomes, which related to changes in parenting</td>
<td>No control group; high attrition; low internal consistency for measures</td>
<td></td>
</tr>
</tbody>
</table>

Note. †, study in two sections of Chapter 2 as analytic strategy addresses two questions. For design, L, longitudinal study; CS, cross-sectional study. APSD, Antisocial Process Screening Device; CD, conduct disorder; CP, conduct problems; DC, deceitful-callous; IC, interpersonal-callousness; FFT, Functional Family Therapy; ODD, Oppositional Defiant Disorder; PSD, Psychopathy Screening Device
(see Table 7). Finally, in 21 studies, parent report was used solely or in combination with other reports to construct the measure of parenting and CU traits. In only six studies was the informant for parenting and CU traits different. If parents are asked to reflect on their behavior, including implementation of different discipline strategies, and then evaluate affective/interpersonal characteristics of their child, it is unclear how ratings for one affect the other, making it difficult to interpret studies that only used parent-reported measures.

3.3.2. Does parenting directly predict level of youth CU traits? (Figure 2a)

Studies addressing this research question directly tested the association between a continuous measure of parenting and continuous outcome of CU traits.

Early childhood/preschool (ages 3-6)

Two studies investigated the longitudinal prediction of CU traits by dimensions of parenting in preschool samples. First, Hawes, Dadds, Frost, and Hasking (2011), in a representative sample (aged 3-10 years; \( N = 1008 \)), found that parental positive reinforcement predicted lower CU traits one year later. There were interactions between positive reinforcement and gender, poor monitoring/supervision and age, and between parental involvement and sex. Second, Waller et al. (2012b) found that CU traits at ages 3 and 4 were predicted by observed and parent-reported harshness (at ages 2 and 3), controlling for age 2 CU traits and demographic factors in a large, high risk sample (\( N = 731 \)).

Middle/late childhood (ages 7-12)

Six studies investigated the direct prediction of CU traits by parenting in middle childhood.
First, Vitacco, Neumann, Ramos, and Roberts (2003) found that youth reports of poor parental monitoring and inconsistent discipline were cross-sectionally related to narcissism and impulsivity, but not CU traits, in a community sample of Hispanic females (N = 136). Second, Frick et al. (2003a) investigated predictors of CU trait stability over four annual assessments (N = 98). Selection from a community sample via stratified sampling ensured enough youth with high CU traits, although this may have meant that antisocial youth were overrepresented. CU traits at the final assessment point were partially correlated with earlier negative parenting (parent and youth report), controlling for earlier CU traits. Third, Pardini et al. (2007) investigated predictors of CU traits and AB in an aggressive sample (9-12 years old; N = 120) over a year. Controlling for earlier AB, parent-reported corporal punishment and child-reported parental warmth/involvement predicted CU traits one year later. There was a marginally significant interaction suggesting that children with low anxiety who reported low parental warmth showed increases in CU traits one year later. Fourth, Loney, Huntenburg, Counts-Allan, and Schmeelk (2007b) found that dysfunctional parenting practices fully mediated the association between maternal psychopathic traits and child CU traits in a representative sample (N = 83; ages 7-14 years old). Fifth, in a longitudinal study of monozygotic twin pairs (N = 4508), Viding et al. (2009) found that age 7 parent-reported negative discipline predicted parent- and teacher-reported CU traits at age 12, after controlling for earlier CU traits. However, age 7 negative discipline did not predict monozygotic twin differences in CU traits at age 12, controlling for age 7 CU traits. The authors speculated that associations reflected gene-environment correlations (i.e., genes and environment provided by parents but further evoked by a child with CU traits). As such, negative parental discipline could be a non-shared environmental risk factor for AB development but not CU traits during this age period (see Viding et al., 2005). Finally,
McDonald, Dodson, Rosenfield, and Jouriles (2011) assessed the association between parenting and CU traits in the context of a randomized controlled trial (RCT) of an intervention for conduct problems in children aged 4-9 years old (N = 66), recruited from domestic violence shelters. Assessments took place at baseline, and 4, 8, 12, 16, and 20 months post-baseline. Two parenting variables (psychological aggression and inconsistency) were related to increases in psychopathic features over time (total PSD score and a CU-like subscale) and mediated reductions in psychopathic features in the treatment group.

Adolescence (ages 13-18)

Two studies investigated associations between parenting and CU traits in adolescence. First, Pardini and Loeber (2008) investigated predictors of CU traits stability over seven assessments in a high risk, male sample (N = 506). Parenting was assessed via five time 1 measures using summed child and parent reports, including poor supervision, physical punishment, and poor parent-child communication. All parenting variables were related to higher initial levels of CU traits in bivariate analyses. In a final multivariate model however, only higher conduct problems, ADHD, and poor parent-child communication predicted higher initial CU traits, and only higher conduct problems and poor parent-child communication predicted CU traits at the final assessment point. No parenting predictors were associated with the slope of CU traits. Second, Barker et al. (2011) assessed predictors of CU traits at age 13 within the context of large, ongoing population-based study of a twin cohort (N = 6673). Maternal reports of harsh parenting at age 4 were associated with higher levels of CU traits at age 13. In a significant indirect pathway, prenatal risk predicted boys’
fearlessness at age 2, which was associated with higher levels of harsh parenting at age 4, and higher levels of CU traits at age 13.

Summary

Across all studies, a relatively consistent picture emerges across a range of developmental stages, suggesting that dimensions of parenting are associated with CU traits when the relationship is assessed directly. Of the eight studies providing evidence that parenting is related to CU traits, seven were longitudinal, and in testing for prediction by parenting, controlled for earlier CU traits or antisocial behavior. As such, there is evidence that parenting is prospectively associated with CU traits, over and above earlier child-driven effects. In six studies, negative dimensions of parenting predicted youth CU traits. Specifically, harsh parenting experienced in early childhood (Barker et al., 2011; Waller et al., 2012b), negative discipline (Viding et al., 2009), corporal punishment (Pardini et al., 2007) and psychological aggression and inconsistent discipline (McDonald et al., 2011) experienced in middle childhood, and poor parent-child communication in adolescence (Loeber & Pardini, 2008) all predicted higher levels of CU traits. There is also evidence that positive parenting predicts decreases in CU traits. Positive reinforcement in early childhood (Hawes et al., 2011), child-reported positive parenting (Frick et al., 2003a) and child-reported parental warmth (Pardini et al., 2007) in middle childhood were associated with lower CU traits. In addition, interaction tests suggest that parental involvement is particularly important to decreases in CU traits in boys, that supervision/monitoring and positive reinforcement are more important in girls (Hawes et al., 2011), and that parental warmth has a more pronounced effect on decreases in CU traits for children with low anxiety (Pardini et al., 2007).
In light of the evidence presented above, it is challenging to interpret findings of the one study that did not find evidence for a direct association between parenting and CU traits (Vitacco et al., 2003). Interestingly, this was one of only two cross-sectional studies, and it relied on child reports of both parenting and CU traits among Hispanic females. It is difficult to generalize these findings to community or at-risk mixed gender and multi-ethnic samples. Furthermore, it is difficult to be confident about the validity of measures when relying solely on child reports of parenting, especially when the outcome is deficient affective and socioemotional experience. It is also interesting to consider the findings of Viding et al. (2009) alongside the evidence for a prospective association between negative dimensions of parenting and the development of CU traits. While Viding and colleagues themselves present evidence for such an association in what they describe as a ‘phenotypic analysis’, negative discipline only predicted monozygotic twin differences in antisocial behavior, not CU traits. This pattern of results highlights the need for studies to take into account passive correlations (i.e., correlations between child behavior and the parenting environment because of a shared genetically transmitted liability) and evocative correlations (i.e., child’s traits evoke poor parenting responses) when considering associations between parent and child behavior. Indeed, this conclusion is supported by the high heritability estimates obtained for the conduct problems of children with high concurrent levels of CU traits (e.g., Viding et al., 2005).

While the majority of the studies in this section attempted to control for earlier child CU traits or antisocial behavior, studies did not consistently control for one or both, and few studies considered in detail the effects of emerging CU traits versus antisocial behavior on parenting behavior at different ages. Interestingly, one study did investigate child-driven effects on parenting. Hawes et al. (2011) tested whether CU traits directly predicted
parenting over a one-year period, controlling for earlier antisocial behavior. Higher levels of CU traits predicted inconsistent parental discipline across ages, decreased parental involvement in older boys, and increased corporal punishment among older children. The prediction of parenting dimensions by CU traits showed larger effect sizes than by antisocial behavior in general. As such, the results highlight the role of CU traits in conferring greater risk for the development of antisocial behavior by uniquely shaping parenting.

Future studies that assess whether parenting directly predicts CU traits would therefore benefit from simultaneously considering the effects of emerging CU traits on parenting. Hawes et al. (2011) provide a useful model for how to test this question. However, a more powerful analysis could involve testing cascade models in which CU traits and parenting predict each other across multiple time points, thereby enabling a clearer picture to be built up of the kinds of interactions occurring in families with a youth at risk of developing, or already showing, high levels of CU traits. It is also worth noting that a better understanding of parent-child interactions is vital for intervention, even if risk for them is underpinned by shared genetic liability. Finally, interactions between a parent and youth with high CU traits may differ with age, although future studies are needed to develop a precise understanding of associations at different ages of youth to inform intervention.

3.3.3. Does parenting predict youth antisocial behavior at different levels of CU traits? (Figure 2b)

Studies addressing this question investigate whether associations between continuous measures of parenting and antisocial behavior are moderated by youth CU traits.
Specifically, an interaction term is added to regression models (parenting × CU traits). If significant, the association between parenting and antisocial behavior is tested at high versus low levels of CU traits.

Early childhood/preschool (ages 3-6)

Two studies assessed moderation of the association between parenting and antisocial behavior by CU traits in preschool samples. First, Koglin and Petermann (2008) found a trend towards significance ($p < .10$) for the interaction between low parental involvement and CU traits predicting aggressive behavior in a representative sample of Kindergarten children ($N = 177$) assessed cross-sectionally. In addition, inconsistent discipline was related to aggression, but only for boys ($N = 89$) with low levels of CU traits. Second, Hyde et al. (2013) tested whether age 3 CU traits moderated the association between age 3 observed positive parenting and growth in child conduct problems from ages 2-4, and found that it did not.

Middle/late childhood (ages 7-12)

Eight studies (six cross-sectional) investigated moderation of the association between parenting and antisocial behavior by CU traits in middle/late childhood. First, Wootton, Frick, Shelton, and Silverthorn (1997) investigated whether a dichotomous CU traits measure moderated associations between parenting and conduct problems among clinic-referred males ($N = 166$). CU traits were always associated with conduct problems. Interactions between CU traits and ineffective parenting, and CU traits and positive parenting were significant. For each, associations between parenting and conduct problems were stronger for boys with low levels of CU traits. However, it is difficult to interpret the
results, as only three of six models tested included significant interaction terms. Second, Oxford et al. (2003) tested whether CU traits moderated associations between ineffective parenting and conduct problems in aggressive children (N = 199), attempting to replicate and extend the findings of Wootton et al. Four conduct problems outcomes were tested (two different teacher reports of externalizing behavior, parent-reported externalizing behavior, and peer-nominated aggression) using dichotomous (high vs. low) and continuous CU traits measures. CU traits were always related to conduct problems. The interaction term between CU traits (dichotomous) and ineffective parenting was only significant in predicting peer-nominated aggression score (one of four models). The interaction term between CU traits (continuous) and ineffective parenting was a significant predictor of teacher-reported externalizing and peer-nominated aggression scores (two of four models). Despite the fact that more models than not featured non-significant interaction terms, the authors argued that the results provided partial support for CU traits moderating associations between parenting and conduct problems.

Third, Hipwell et al. (2007) investigated the moderating effects of CU traits on associations between conduct problems and parenting in girls (7-8 years; N = 990). In regression analysis, controlling for demographic factors and conduct problems, CU traits were not directly related to harsh punishment or low warmth (design was different to other studies as parenting was the outcome). However, the interaction between CU traits and conduct problems was significantly related to harsh parenting and low parental warmth. The magnitude of the association between conduct problems and parenting decreased with increasing levels of CU traits (although remained significant in each case). Fourth, Falk and Lee (2011) investigated whether CU traits moderated associations between parenting and antisocial behavior in children with and without ADHD (6-9 years; N = 208). For children
with low/mean levels of CU traits, lower positive parenting was associated with parent-reported (but not teacher-reported) CD symptoms, controlling for ADHD (one of four models). There were, however, no significant interactions between negative parenting and CU traits for parent or teacher reported ODD or CD symptoms (three of four models).

Fifth, Pasalich et al. (2011b) investigated whether CU traits moderated associations between observed parental coercion versus parental warmth (coded from speech samples) and conduct problems in clinic-referred boys (3-10 years; \(N = 95\)). For mothers and fathers, coercion was related to conduct problems in boys with low CU traits. In contrast, maternal warmth was associated with fewer conduct problems at high/mean levels of CU traits, suggesting warmth could be a specific buffer against the development of antisocial behavior for boys with high levels of CU traits. Finally, in a large, representative sample (\(N = 1210\)), Yeh et al. (2011) found that negative and positive parental affect interacted with youth psychopathy scores to predict reactive and proactive aggression. Low levels of positive parental affect and high levels of negative parental affect were associated with higher levels of reactive aggression, but only at low levels of psychopathic traits. In contrast, higher levels of negative parental affect were associated with more proactive aggression, but only at mean or high levels of psychopathic traits. These interactions were similar whether total psychopathy score or affect subscale score (similar to CU traits scale) were used (K.C. Jacobson; personal communication, March 2012). The moderating effect of psychopathic traits on associations between parenting and AB is similar to the findings of other studies for the outcome of reactive aggression. However, the opposite pattern of results for proactive aggression suggests that children with high levels of psychopathic traits may be more at risk of learning from negative displays of parental affect they experience, although results need replication in other samples. In particular, results need
replicating given that other studies have found that positive parental affect may be more important to conduct problems among youth with high levels of CU traits. Indeed, it is unclear why parental negative affect might be related to proactive aggression for youth with high levels of CU traits. Future studies are therefore needed to examine differential associations between dimensions of parenting (including parental affect) and reactive versus proactive aggression at different levels of CU traits.

Two studies investigated whether CU traits moderated longitudinal associations between parenting and antisocial behavior. First, Pardini et al. (2007) investigated predictors of CU traits and antisocial behavior in a sample of aggressive children over one year (age 9-12 years; \( N = 120 \)). As one of several analyses (see earlier), Pardini et al. tested the prediction of conduct problems by interactions between various parenting dimensions and CU traits. No interaction terms were significant. Second, Kroneman et al. (2011) tested whether CU traits interacted with parenting to predict five-year CD/ODD symptom trajectories in girls \( (N = 1233, \text{ age } 7-8) \) from middle childhood to early adolescence, following-up on the cross-sectional study of Hipwell et al. (2007). Low parental warmth was more strongly associated with higher initial CD/ODD symptoms and faster decreasing CD/ODD symptoms for girls with high levels of CU traits. However, by year five, the interaction between low parental warmth and CU traits was no longer significant. Nevertheless, parental warmth may be important in protecting against the development of antisocial behavior for girls who show high CU traits, particularly during middle childhood.

**Adolescence (ages 13-18)**

One study meeting the inclusion criteria investigated this question in adolescence. Muñoz, Pakalniskiene, and Frick (2011) tested bidirectional relations between dimensions of
parenting (control, knowledge, and solicitation) and antisocial behavior over a year, using cross-lagged panel models \( (N = 98) \). Of relevance to the inclusion criteria of Chapter 3, multi-group moderator analysis (high vs. low CU traits) of cross-lagged models was conducted. Higher levels of parental control predicted increases in knowledge, and higher solicitation predicted increased control in the low CU traits group. Having less knowledge led to increased parental control for youth with low CU traits, whereas less knowledge led to decreased control for youth with high CU traits. This pattern of associations highlights the importance of youth characteristics (e.g., willingness to lie) to future parenting, which may contribute to increasing antisocial behavior over time.

**Summary**

It has been hypothesized that youth with high levels of CU traits are less influenced by negative dimensions of parenting (including harsh discipline and coercion) because of punishment insensitivity (Blair et al., 2001b), reduced responsivity to negative stimuli (Blair et al., 2001a), and physiological hypoarousal (e.g., Marsh et al., 2008). Despite appearing to be a well-established finding in the literature, this chapter suggests that evidence for CU traits moderating associations between dimensions of parenting and antisocial behavior is mixed. For example, of five longitudinal studies, three found evidence of moderation by CU traits and two did not. Of the seven cross-sectional studies, five reported some moderation (but not in all models tested) and one reported moderation in different directions (association between parenting and conduct problems was at high or low levels of CU traits depending on the dimension of parenting or antisocial behavior assessed). Chapter 3 therefore first challenges the highly cited notion in the field that CU traits develop independently of parenting when this study design is adopted. For example,
in the two most commonly cited papers investigating the question of moderation by CU traits (Wootton et al., 318 citations; Oxford et al., 107 citations, March 2013), neither address questions relating to the development of CU traits per se; both studies are cross-sectional and have antisocial behavior as the outcome. Furthermore, in both studies, interaction terms between CU traits and parenting are more frequently non-significant.

Second, methodological caveats for studies that have investigated the question of CU traits as a cross-sectional moderator are particularly relevant to any conclusions that can be drawn. All five cross-sectional studies that found evidence for moderation by CU traits relied on parent reports of parenting and parent report as a major part of their measure of CU traits (e.g., Koglin & Petermann, 2008; Oxford et al., 2003; Wootton et al., 1997). As already outlined, it is not clear how a parent’s rating of their own parenting strategies (including effective discipline, warmth, or positive parent-child interactions) might impact on their perception of their child’s affective and socioemotional characteristics (and vice versa). Furthermore, several studies are limited by having low alphas for their measures of CU traits (Falk & Lee, 2011; Hipwell et al., 2007; Kroneman et al., 2011) or parenting (Pardini et al., 2007; Yeh et al., 2011). It is also difficult to generalize from studies that assessed small, clinic-based samples (Pasalich et al., 2011b; Wootton et al., 1997). Methodologically stronger studies had large samples (Hipwell et al., 2007; Hyde et al., 2013) and assessed parenting versus CU traits using different methods (Hyde et al., 2013; Pasalich et al., 2011b; Yeh et al., 2011) to minimize shared method variance.

Taking into account strengths and limitations of studies, and focusing only on models that included significant interactions, there is some evidence that negative dimensions of parenting are cross-sectionally related to antisocial behavior in youth with low but not high levels of CU traits. This pattern emerged for inconsistent discipline in
preschoolers (Koglin & Petermann, 2008), and negative affect (Yeh et al., 2011), harshness
(Hipwell et al., 2007), ineffective parenting (Oxford et al., 2003; Wootton et al., 1997) and coercion (Pasalich et al., 2011b) in middle-childhood. This pattern of findings found in studies, comprising community, high risk, aggressive, and clinic-referred samples of different ages, suggests that similar mechanisms may underlie cross-sectional associations between parenting, CU traits, and antisocial behavior across youth.

However, recent studies complicate the picture. First, Yeh and colleagues found that negative parental affect was associated with reactive aggression at low levels of CU traits, but proactive aggression at high levels of CU traits. This finding suggests that future studies might benefit from separating different forms of aggression when measuring antisocial behavior. At the same time, the overlap between conceptualizations and measurement of proactive aggression and CU traits needs further consideration. However, a particular strength of this study is the different reporter for proactive aggression (youth self-report) versus CU traits (parent-report), reducing the risk of shared method variance. The results also suggest there may be important etiological differences in the development of proactive versus reactive aggression that may be related to both parenting and the presence of, or overlap with, CU traits. For example, through social learning processes, children with high levels of CU traits may learn to value aggressive strategies to obtain reward following exposure to aggressive role models.

Second, while Kroneman et al. (2011) did not find evidence that harsh parenting predicted antisocial behavior differently in girls with low versus high levels of CU traits, they speculated that the developmental period in which harsh parenting influences behavior is earlier than that captured by the age of their sample. This point highlights that few of the included studies made predictions about which dimensions of negative parenting may be
specifically relevant at different ages. For example, parental harshness could be more important to antisocial behavior development in young children, whereas poor parental monitoring may be a more salient dimension to investigate among adolescents with different levels of CU traits. Indeed, Muñoz et al. (2011) found that among adolescents with high levels of CU traits, parents with less knowledge decreased their control over time. However, other dimensions of parenting may be important concomitants. For example, a parent who has fostered a warm relationship during early/middle childhood could be more effective in monitoring during adolescence, and it is unclear the extent to which a third, unobserved variable, such as a shared genetic liability for low warmth, may better explain the associations. At the same time, the sharper increase in self-reported delinquency of youth with high CU traits reported by Muñoz et al. indicates a need for a better understanding of the strategies parents could employ to manage antisocial behavior.

Finally, a less consistent picture emerges from studies that have investigated positive dimensions of parenting. Two studies suggest that low positive parenting is related to conduct problems for youth with high CU traits (Pasalich et al., 2011b; Kroneman et al., 2011). It is noteworthy that a similar pattern of results was found in these two studies that separately assessed boys and girls. The results also suggest that, in middle childhood at least, children with high levels of CU traits may be especially responsive to a parent-child relationship characterized by positive affect and warmth, which may serve to promote their emotional responding, internalization of values (Pasalich et al., 2011b) and protect against the development of antisocial behavior. In contrast, Yeh et al. (2011) found that lower positive parental affect was related to reactive aggression in children with low levels of CU traits. Lower levels of positive parenting were also related to conduct problems only at low levels of CU traits in two clinic-referred samples (Falk & Lee, 2011; Wootton et al., 1997),
although the methodological issues of these latter two studies make the results difficult to interpret. Finally, two studies that assessed whether CU traits moderated a longitudinal association between positive parenting and conduct problems did not report significant interactions (Hyde et al., 2013; Pardini et al., 2007). Further empirical work is therefore needed to understand associations between positive dimensions of parenting and conduct problems at varying levels of CU traits. As with negative parenting, future studies would benefit from increased precision in operationalization of parenting, and from making specific predictions about the importance of different parenting practices at different ages.

3.3.4. Does parenting differ between subgroups of youth categorized according to their level of antisocial behavior and CU traits? (Figure 2c)

Studies addressing this question test a variation of the moderator question outlined above. Studies create groups using cutoff scores on CU traits and antisocial behavior questionnaires (although by definition, the level of antisocial behavior may be high across certain samples). The most common groups created are a high antisocial behavior and high CU traits group (AB+CU+), a high antisocial behavior and low CU traits group (AB+CU-), and a group with low antisocial behavior and CU traits (control; AB-CU-). Studies test for significant differences in parenting (assessed prospectively or cross-sectionally in relation to CU traits/antisocial behavior) between groups at one time point or across time (i.e., based on stability of CU traits/antisocial behavior).

**Early childhood/preschool (ages 3-6)**

No studies have investigated this question in early childhood/preschool samples (although see Barker et al., 2011).
Middle/late childhood (ages 7-12)

Four studies have assessed parenting between groups of youth classified according to antisocial behavior/CU traits in middle childhood. Enebrink, Andershed, and Langstrom (2005) cross-sectionally tested associations between parenting factors and CU traits group membership in clinic-referred boys (N = 41; antisocial behavior high across sample). Parenting was assessed via interview and evaluation of case records. The AB+CU+ group (N = 13) was more likely to have experienced poor household circumstances and high family stress (which remained significant after controlling for ODD/CD symptoms), but did not differ on other measures (including little caregiver continuity and ineffective parenting). However, the small size of the subsamples and cross-sectional design reduces the generalizability of the results.

In the first of three longitudinal studies, Frick et al. (2003a) generated CU traits stability patterns for 98 aggressive youth. Controlling for SES and intelligence, earlier conduct problems and youth-reported positive parenting differed between groups; the stable high CU traits group displayed higher levels of conduct problems and lower positive parenting. Nevertheless, the small sample sizes of the groups (as small as n = 8) make it difficult to draw generalizable conclusions. Second, Larsson, Viding, and Plomin (2008a) assessed parenting characteristics associated with antisocial behavior/CU traits in a population cohort of twins (N = 4430). Four groups were created at age 7: CU+, AB+, AB+CU+, and AB-CU-. Children in the AB+CU+ and AB+ groups had experienced more negative parental feelings and harsher discipline at ages 3, 4, and 7 compared to AB-CU- and CU+ groups. The CU+ group had also experienced harsher parental discipline compared to the control group at ages 4 and 7. However, these effects disappeared after
controlling for earlier conduct problems, which suggests that the influence of negative parenting on antisocial behavior development may be through child-driven effects. However, CU traits were not measured at an earlier time point (only as an outcome), so it is unclear whether CU traits versus antisocial behavior in general were driving any differences in parenting found between groups.

Third, Fontaine et al. (2011) investigated associations between antisocial behavior/CU trait trajectories and parenting using a population-based twin sample (N = 9578). Growth mixture modeling was used to select empirically a four-trajectory model for CU traits (stable high, increasing, decreasing, stable low) and a two-trajectory model for antisocial behavior (high versus low). None of the sample had the AB+CU- trajectory. Seven joint AB/CU traits trajectories were identified, including AB-CU- (75%), AB-CU increasing (5%); AB+CU increasing (2%), and AB+CU+ (4%). Next, childhood predictors of trajectories were tested. Two findings are most relevant to the inclusions criteria for this chapter. First, the AB+CU+ group had higher levels of all the negative parenting and family-level predictors (low SES and chaos in the home) compared to the AB-CU- group. Second, the AB+CU+ group had higher levels of family chaos versus the AB+CU increasing group. The comparison of these groups enables effects of severe antisocial behavior to be controlled for as antisocial behavior is high across groups. It appears that high versus increasing levels of CU traits are associated with a more negative family environment, although there were no differences for any of the parenting practice variables. The large proportion of youth in this sample who demonstrated changing scores across time also undermines the notion of CU traits as ‘trait’-like, fixed, or stable. Further, the sophisticated trajectory analysis adopted, which is common to antisocial behavior research in general, but relatively novel in research on CU traits, is a particular strength of the study.
Adolescence (ages 13-18)

First, Barker et al. (2011) assessed a large birth cohort \( N = 6673 \), with data collected prenatally, and at 2 and 4 years old. Cut-off scores were used to create groups at age 13, including AB+CU-, AB+CU+, AB-CU+, and AB-CU- groups. Of relevance to Chapter 3, the AB+CU+ group experienced higher levels of nearly all risk factors, including harsh parenting and low parental warmth compared to the AB-CU- group. In addition, compared to AB+CU-, the AB+CU+ group was of lower SES, and had experienced greater levels of maternal psychopathology, harsh parenting, partner cruelty towards mother, and their mother endorsing they ‘did not enjoy their child’. Second, Kimonis, Frick, and Barry (2004) investigated associations between antisocial behavior and having delinquent peers for youth with high versus low levels of CU traits, and whether parenting mediated associations. Parenting and CU traits were assessed in the same sample as Frick et al. (see earlier; \( N = 98 \)) and their association with peer delinquency was tested annually for four years. High levels of CU traits were associated with more dysfunctional parenting over time, particularly in the AB+CU+ group.

Summary

Several interesting findings emerge from across the six studies that have assessed differences between antisocial behavior/CU traits groups. First, the most compromised parenting is experienced by an AB+CU+ group. When assessed in middle childhood and compared with an AB-CU- group, the AB+CU+ group had experienced more negative parental feelings and harsher discipline at ages 3, 4 and 7 (Fontaine et al., 2011; Larsson et al., 2008a), more chaos in the home at 4 (Fontaine et al., 2011), and higher family stress
and poorer household circumstances (Enebrink et al., 2005). When assessed in adolescence, an AB+CU+ group experienced harsher parenting and less warmth at ages 2 and 4 (Barker et al., 2011) and more dysfunctional parenting (Kimonis et al., 2004). Nevertheless, it is difficult to draw conclusions about the unique effect of parenting on CU traits when considering the contrast of AB+CU+ versus AB-CU-. Specifically, the findings of differences in parenting between these groups may simply represent a severity effect. Indeed, in samples where youth have high levels of antisocial behavior (e.g., Enebrink et al., Frick et al., 2003a), it is unclear how parenting contributes to the development of CU traits. As such, studies that investigated differences in the parenting received by AB+CU+ versus AB+CU-, or the trajectories of antisocial behavior and CU traits, provide better evidence about the unique effect of parenting on CU traits. For example, Barker et al. (2011) found that their AB+CU+ group experienced more risk parental risk factors compared to their AB+CU- group. Another contrast that would separate apart the effect of parenting on CU traits versus antisocial behavior in general would be to test AB-CU+ versus AB-CU-, although the low prevalence of youth with AB-CU+ may make this difficult in practice. It is worth noting however, that many of these studies did not seek to investigate the unique effect of parenting on CU traits and assessed a variety of different risk factors in the context of existing high levels of antisocial behavior. Indeed, it is important to keep in mind different study aims, and studies adopting this design should not be conflated with those investigating direct associations between parenting and CU traits. Finally, it is not clear how meaningful a median-level or mean-level split is for categorizing youth as being high or low on CU traits, given that many studies employ a 6-item scale in the first place. While a categoric approach to classifying ‘psychopathy’ as present or absent
among adult offenders is well established, the same approach may not be applicable to different types of samples of youth and certainly needs further study.

3.3.5. Do parenting interventions directly reduce the level of youth CU traits? (Figure 2d)

Studies addressing this question test whether interventions that change parenting practices have a direct effect on the level of youth CU traits.

Early childhood/preschool (ages 3-6)

Somech and Elizur (2012) conducted an RCT to test the effectiveness of a parenting intervention for parents of children at risk of conduct problems (intervention, N = 140; control, N = 69). Assessments took place pre-intervention, post-intervention, and at one year follow-up. Intervention effects were found on conduct problems and CU traits both in an intention-to-treat analysis and when focusing only on families who completed treatment. The intervention components were drawn from other well-evidenced parenting programs, and the RCT design is a notable strength of the study. However, high attrition in both groups (intervention, n = 96; control, n = 29 at one year follow-up) was a substantial weakness and make it a difficult study to draw conclusions from. Finally, reductions in CU traits were mediated through improvements in parental practices and distress (Y. Somech, personal communication, July 2012).

Middle/late childhood (ages 7-12)

First, Hawes and Dadds (2007) assessed the effect of a manualized parenting program on CU traits in boys with ODD or CD (4-8 years; N = 49). Pre- and post-treatment changes
were found in the level of CU traits, and a subset of the sample showed marked reductions in CU traits. When boys were classified according to pre- and post-treatment levels of CU traits as stable-low, unstable, or stable-high, the stable-high group was found to show more severe levels of conduct problems at follow-up regardless of initial conduct problems. Furthermore, while the frequency of parents implementing strategies, including time-out, did not differ between groups, parents rated time-out as less effective for stable-high boys. However, assessment of parenting relied on single-item questions and subgroup sample sizes for these analyses were very small. Finally, the study was not an RCT so there was no comparison group, which makes it difficult to interpret results. Second, Kolko et al., (2009) investigated treatment effects (community- vs. clinic-delivered) on CU traits among children with ODD/CD (6-11 years; subsample of Kolko & Pardini, 2010, see later). Treatment comprised seven personalized components, including parent management training. Assessments were pretreatment, post-treatment, and various follow-ups (6, 12, 24, 36 months). Children in both arms of the intervention demonstrated reductions in rates of ODD/CD and teacher-reported CU traits across the 3-year follow-up. Third, McDonald et al. (2011) conducted an RCT to test whether a manualized parenting intervention for conduct problems reduced CU traits (4-9 years, N = 66). Families were recruited from domestic violence shelters and followed up at 4, 8, 12, 16, and 20 months. Greater reductions were found for general psychopathic features of children in the intervention group versus control group, over and above effects on conduct problems. Results were similar using a combined CU traits/narcissism scale versus total psychopathy score. Reductions in psychopathy were mediated by improvements in mothers’ harsh and inconsistent parenting.
Adolescence (ages 13-18)

No studies have addressed this question in adolescent samples.

Summary

Very few studies of interventions directly targeting CU traits in youth exist. Fewer still have investigated treatment of CU traits using parenting interventions. This is in contrast to the large evidence base supporting the effectiveness of parenting interventions for youth antisocial behavior in general (Piquero et al., 2009). First, Chapter 3 of this thesis therefore points to the need for more empirical evaluations of the effect of parenting interventions on youth CU traits. Of the four studies that did assess the effect of parenting interventions, all four demonstrated that across samples of children from early and middle childhood, CU traits are responsive to intervention. Second, Chapter 3 highlights the need for studies to adopt an RCT design when investigating the effect of parenting interventions on CU traits (e.g., McDonald et al., 2011; Somech & Elizur, 2012). An RCT design enables stronger conclusions to be drawn about the effects of changing parenting practices on child behavior. Indeed, improvements in parenting mediated intervention effects on CU traits in early (Y. Elizur, personal communication, July 2012) and middle childhood (McDonald et al., 2011). As such, there is support for the notion that CU traits show malleability and responsivity to changes in parenting practices.

At the same time, more creative randomized trial designs are needed, in order to test the effects of parenting interventions on both CU traits and antisocial behavior. Potential alternative study designs are shown in Figure 2. For example, interventions that target parenting could produce simultaneous improvement in CU traits and antisocial behavior
improvement in specific aspects of parenting (e.g., parental warmth versus proactiveness) might be uniquely related to improvements in CU traits versus general antisocial behavior respectively (Figure 2g). Intervention research to test these and other alternative designs should be guided by risk factor and observational research (i.e., Figures 2a and 2b), considering the type of sample/level of existing antisocial behavior (i.e., community versus adjudicated), age of the sample (which might also be related to level of conduct problems /entrenched antisocial behavior), and most appropriate parenting dimension to assess. Finally, studies could investigate whether changes in CU traits versus antisocial behavior mediate changes in the other. Specifically, study designs are needed to investigate whether targeting antisocial behavior has a collateral effect on CU traits, or vice versa.

3.3.6. Do CU traits predict or moderate effectiveness of parenting interventions for antisocial behavior? (Figure 2e)

Studies addressing this question test whether youth with high levels of CU traits benefit less from parenting-focused interventions for antisocial behavior, or if it is harder for parents to change their own/youth behavior in the presence of high levels of CU traits.

Early childhood/preschool (ages 3-6)

Hyde et al. (2013) investigated whether early signs of CU traits reduced the effectiveness of the Family Check Up (Dishion et al., 2008), a brief, tailored parenting intervention combined with motivational enhancement, for early conduct problems in a preschool sample. Hyde et al. modeled three continuous interactions, testing whether CU traits moderated, (1) the link between treatment and conduct problems growth from ages 2 to 4,
(2) the link between treatment group and improvements in positive parenting, (3) the link between improvements in positive parenting and conduct problems growth. While CU traits predicted conduct problems growth from ages 2-4, there was no interaction between CU traits and intervention. Specifically, CU traits did not moderate the effectiveness of intervention on changes in parenting nor the effectiveness of changes in parenting on improvements in child conduct problems, nor the overall direct intervention effect on child conduct problems. This very thorough longitudinal analysis (interactions were tested continuously and dichotomously, within and cross informant) increases the validity of the results, and suggests that personalized and tailored parenting-focused interventions may be effective in targeting early-starting conduct problems in very young children, regardless of early manifestations of CU traits.

Middle/late childhood (ages 7-12)

First, using the same sample as their 2007 study, Hawes and Dadds (2005) investigated whether CU traits predicted treatment outcomes for 4-8 year-old boys with ODD or CD (N = 49). Treatment was a manualized parent-training intervention, which comprised a 1.5-hour assessment session, and nine weekly sessions. Higher levels of CU traits were associated with increased likelihood of an ODD diagnosis at follow-up, controlling for pre-treatment ODD. Observed implementation of different parenting strategies did not contribute significantly to models. However, the small sample size and lack of a control group make these results difficult to interpret. Indeed, without a control group, this study can only be considered to have adopted a predictor rather than a moderator design.

Second, Kolko and Pardini (2010) assessed outcomes of 139 children receiving
treatment for AB, and included 38 ‘treatment as usual’ children in the analysis as a comparison condition. CD and ODD symptoms were assessed following diagnostic interviews with both the parent and child, which clinicians used to rate the presence of symptoms. A categorical variable of CU traits was created based on teachers endorsing the presence of four of the six APSD CU traits items. Pre-treatment CD was the strongest predictor of persistent CD and, interestingly, CU traits did not predict treatment outcome. The pattern of results was the same using the six-item CU traits subscale of the APSD. Interestingly, higher teacher-reported total APSD score was associated with lower CD symptoms controlling for demographic covariates and pre-treatment levels of CD, suggesting this flexible, modular-based intervention was successful in targeting the general psychopathic features of children with early-onset AB (CU traits in combination with narcissism and impulsivity). At the same time, in a separate analysis, pre-treatment levels of the ODD dimension of ‘hurtfulness’ (described by Stringaris & Goodman, 2009), predicted post-treatment CD diagnosis and symptoms, and higher levels of parent-reported externalizing behavior.

This finding highlights the complexity of evaluating related dimensions of child problem behavior within treatment studies. For example, it might be that demonstrating ‘hurtfulness’ (i.e., being spiteful, vindictive, or proactively aggressive) is an indicator of those children with ODD who are more likely to go on to develop CD. As such, ‘hurtfulness’ might better be conceptualized as a symptom of CD. However, ODD ‘hurtfulness’ has also been shown to be related to parent-reported callousness (Stringaris & Goodman, 2009), and it undoubtedly has conceptual overlap with the construct of CU traits. To add further to the complexity, it also appears that the informant for child behavior also needs careful consideration. For example, the lack of significant prediction of post-
treatment CD by teacher reports of CU traits using the CU traits subscale of APSD reported by Kolko and Pardini (2010) raises questions about how best to incorporate teacher reports to assess these behaviors (e.g., best-estimate informant, latent variable approach; see section on measurement). Alternatively, shared method variance may account for the associations found between pre-treatment levels of the ODD ‘hurtfulness’ dimension and later CD symptoms (i.e., both were derived from parent/child reports following diagnostic interviews).

Adolescence (ages 13-18)

White (2010) and White et al. (2012) tested if youth-reported CU traits predicted the effectiveness of Functional Family Therapy among an adjudicated sample ($N = 134$), although there was no control group. CU traits were associated with higher pre-treatment behavior dysfunction and violence. However, youth with high levels of CU traits showed the most improvement in response to treatment using both change scores analysis and evaluating the relative proportion of youth with high and low levels of CU traits that showed reliable change in problem behavior. CU traits were also not related to lower treatment participation or dropout. Finally, there were interesting interactions between reporters for parenting measures and treatment responsiveness. For example, when youths reported experiencing more negative parenting, those with high levels of CU traits showed greater improvement in interpersonal relations and disruptive behavior. In contrast, if parents reported on their negative parenting, increases were associated with reduced improvement in social problems and disruptive behavior for youth with high CU traits. White (2010) speculated that the differential findings might be contingent on the meaning of negative parenting to the reporter. Taken in conjunction with the non-prediction of
treatment outcomes found by Kolko and Pardini (2010) using teacher-reported CU traits, Chapter 3 again highlights the need for improved methods to assess parenting versus CU traits. Finally, improvements in positive parenting were related to antisocial behavior outcome in the same way at high versus low levels of CU traits. However, because there was no control group included in the study, it is difficult to draw strong conclusions about the effects of the intervention on CU traits.

**Summary**

Across the four studies that investigated the effectiveness of parenting interventions for antisocial behavior, there is evidence that in different types of samples, ages of youth, and types of intervention (prevention vs. targeted interventions), CU traits are not a moderator of effectiveness. Stronger evidence for this comes from larger studies that included a control group (e.g., Hyde et al., 2013; Kolko & Pardini, 2010). As such, while Hawes and Dadds (2005) is an oft-cited study (139 citations, March 2013), it is not replicated by two more recent studies and the findings are limited by a small sample and non-RCT design. As a result, it is not known how CU traits relate to the conduct problems of a control group, as this was not tested. Indeed, comparison with the more recent analyses of White et al. (2012) highlights that especially without a control group, the way that data is analyzed influences interpretation of results. Specifically, given that CU traits are generally associated with higher antisocial behavior, it is perhaps unsurprising that if CU traits are considered as a predictor of treatment effectiveness (Hawes & Dadds, 2005), they are associated with poorer outcomes. As such, while youth with high levels of CU traits may benefit equally from an intervention, the results suggest they do ‘worse.’ In contrast, White et al., (2012) used change scores, controlling for starting levels of CU traits. Using this approach, the
high CU traits group appears to benefit most, although this may be because they had the most range to improve. Both studies demonstrate that without a control comparison group, the extent to which starting point is taken into account influences results. Indeed, across reviewed studies, analytic approach appears to be strongly related to findings, and should be considered alongside the conclusions of studies.

Various other methodological and theoretical issues should be considered in relation to these four studies. First, it is not clear across studies which intervention components are associated with reductions in conduct problems. For example, the protocols of Kolko and Pardini (2010) enabled youth to receive pharmacotherapy, which may be an important component of change to reduce CU traits (Waschbusch et al., 2007a) and parenting was not assessed. Similarly, while parenting was measured using observed and parent-report methods, Hyde et al. did not report how their flexible intervention was personalized for families. As such, future studies are needed to investigate moderated mediation - whether processes mediating intervention change in antisocial behavior are similar for youth with high versus low levels of CU traits. Future analyses from RCTs could also use multi-group models to assess whether the same mechanisms of change operate among youth with high versus low levels of CU traits (see Hyde et al., 2013). Third, all four studies highlight the need for continued evaluation of how measurement approaches and use of different informants across measures relates to results. For example, White (2010) found a different pattern of results depending on whether parent or youth reports of parenting were used and Kolko and Pardini (2010) found that teacher-reported CU traits did not predict CD/ODD outcomes (whereas parent-reported ‘hurtfulness’ did). Future studies are needed to investigate the use of and best way to combine reports from alternative informants (including parents and teachers, combined using a best-estimate or latent variable approach)
to predict antisocial behavior, as well as the meaning of CU traits to youth and associations with youth versus parent reports of different parenting dimensions.

3.4. Discussion

3.4.1. Integration across studies

Chapter 3 enables several conclusions to be drawn about the state of the evidence about associations between parenting and youth antisocial behavior and CU traits. First, there is consistent evidence showing a prospective association between dimensions of parenting and increases in CU traits, in each development stage. Furthermore, studies that have investigated positive dimensions of parenting suggest that a focus on positive affective dimensions may be of particular relevance to the development or prevention of CU traits (e.g., Kroneman et al., 2011; Pardini et al., 2007; Pasalich et al., 2011b). Second, when children show high levels of CU traits, parental discipline and harshness do not appear to be cross-sectionally related to antisocial behavior. This does not preclude, however, the role that parenting plays in the development of CU traits over time. Indeed, one possibility is that because youth with high CU traits typically appear to have higher levels of antisocial behavior, the lack of a cross-sectional association with parenting may emerge as a statistical artifact. Specifically, because there may be little variability within antisocial behavior for youth with high CU traits to correlate with parenting, it may appear that they are not related (see Hyde et al., 2013). Third, across different ages, youth with antisocial behavior and CU traits appear to have experienced particularly compromised parental rearing environments. Fourth, while CU traits are associated with more severe antisocial behavior, parenting-
focused intervention programs appear effective in reducing youth CU traits. Finally, Chapter 3 does not support the notion that CU traits reduce the effectiveness of interventions for antisocial behavior. Indeed, personalized or flexible treatments benefit antisocial youth (White, 2010; Kolko & Pardini, 2010) and reduce conduct problems in younger children (Hyde et al., 2013; McDonald et al., 2011). These findings challenge the focus on CU traits as unchangeable ‘traits’. They appear to be shaped by parenting and amenable to treatment, though more research is needed to identify which aspects of parenting are most robustly related to decreases in antisocial behavior in the presence of CU traits. This conclusion is in direct contrast to much of the clinical ‘lore’ and descriptions of CU traits commonly found in the literature. The existing message that CU traits are not malleable or a target for treatment is potentially harmful to youth and not consistent with empirical findings. Indeed, as noted above, although several studies have gained much attention and citations within this field, their results are not necessarily consistent with the greater weight of the literature (published more recently in larger, better-designed studies).

Chapter 3 also draws attention to several methodological issues, which are relevant to future studies and models of antisocial behavior development. First, there is a need for greater clarity in how studies frame their research question (Figure 2) and how sample type relates to findings. Indeed, different study questions are often conflated when they are cited. CU traits are commonly referenced as developing ‘independently’ of parenting, based on cross-sectional moderation studies that do not address questions of development. At the same time, an understanding of the development of CU traits in a community sample using a prospective longitudinal design may not be beneficial when considering parenting strategies for older antisocial youth with varying levels of CU traits. Furthermore, treatment
evaluations need to be suitably powered to enable moderator analyses that test whether youth with CU traits respond differentially to parenting interventions. Finally, greater clarity is needed to explain how the research question being tested informs about associations between parenting, CU traits, and antisocial behavior, including an evaluation of how sample type and age is related to findings.

Second, there is significant variation in measurement approaches. A key limitation of many reviewed studies is the low internal consistencies for measures of CU traits and parenting, which affects the results in various ways. Low alphas may reduce the likelihood that studies are able to detect significant associations, or suggest that improved assessment methods are required. However, the fact that many studies showed an association between parenting practices and changes in youth CU traits also calls into question the very construct of ‘CU traits’ in youth, and its stability at younger ages. Further, no studies have demonstrated a prospective association between childhood CU traits and psychopathy in adulthood. Finally, CU traits appear responsive to the key environmental factor of parenting in both passive longitudinal and experimental treatment designs. Therefore, there is a need for continued evaluation of the construct of CU traits and the language of classification used to denote subgroups of antisocial youth in this comparatively new area of research.

Third, the reliance on parent report to assess both parenting and CU traits highlights the need for future studies to seek alternative measurement approaches, including the use of best-estimate scores for CU traits versus latent variables that combine reports from multiple informants. Five reviewed studies incorporated observed measures of parenting (e.g., Pasalich et al., 2011b; Waller et al., 2012b), which reduces shared method variance and the risk that a parent’s judgments of their own child will affect how they report their own
parenting skills, or vice versa. At the same time, however, even the use of observed measures of parenting does not get around the fact that associations between parenting and child behavior might be driven by a third, unobserved variable (such as a shared genetic liability for CU features or lack of warmth). Developing more sophisticated methodological and measurement approaches to assess genetic/environment correlations is a key research priority in this field of study. Future studies would also benefit from considering the dimensions of parenting that are particularly relevant to the development of CU traits versus antisocial behavior in general, and how this might differ between different samples of youth of different ages. For example, positive parental affect may mitigate the developmental pathway of fearlessness, CU traits, and antisocial behavior in early childhood, whereas parental monitoring and control may be more important to reduce antisocial behavior in adolescence. Example approaches to investigate more precise associations between dimensions of parenting and antisocial behavior include age/gender moderator analyses (Hawes et al., 2011), differential prediction of proactive versus reactive aggression (Yeh et al., 2011), or inclusion of related constructs or developmental precursors to CU traits in models, such as ‘fearlessness’ (Barker et al., 2011; Kochanska, 1997; see Chapter 2, Section 2.6.1).

Fourth, there is a need for studies to consider child effects. Few studies included in Chapter 3 examined reciprocity between youth CU traits and antisocial behavior, or how youth behavior is reciprocally related to parenting over time (exceptions include: Hawes et al., 2011; Larsson et al., 2008a; Muñoz et al., 2011). Indeed, risk factor analyses involve controlling for potentially confounding variables, including earlier antisocial behavior. Across included studies, there was some consistency in covariates included in models (commonly gender and SES) although few studies provided justification for this. Indeed,
future studies should be as transparent as possible about the effects of controlling for various covariates (including earlier CU traits) on results (see Study 1 of this thesis). Cross-lagged panel models may be a useful analytic strategy to disentangle evocative effects between parenting, CU traits, and antisocial behavior in both risk factor studies (Muñoz et al., 2011; and see Studies 3 and 5 of this thesis) and treatment studies (see Figure 2g). Further, the inclusion of covariates, such as measures of parental psychopathic traits, to act as proxies for gene-environment correlations between parent and child may enable models to control for these associations even in non-genetically informative designs (e.g., Loney et al., 2007b).

3.4.2. Limitations

There are several limitations to Chapter 3, which should be considered alongside the results and the conclusions drawn. First, while the search strategy was carefully constructed, it could not identify relevant, potentially non-significant, but unpublished findings. Second, when there are many study variables, as may be the case with the larger longitudinal studies included in Chapter 3, there remains the risk of selective reporting, such that only the ‘interesting’ results receive attention. It is unclear how this form of bias impacts on what is known about associations between parenting and CU traits. However, there is considerable evidence from evaluations in other fields (e.g., Eisner, 2009) suggesting that this kind of selective reporting might be a considerable source of bias. Third, the heterogeneity of identified studies did not allow for meta-analysis of results, although the classification of studies according to research question addressed aimed to clarify associations.

3.4.3. Conclusions and future directions
Chapter 3 identified 30 studies that have investigated associations between parenting, youth CU traits, and antisocial behavior, addressing one of five different research questions. There was consistent evidence for a prospective association between parenting and CU traits, in both longitudinal and intervention studies, which demonstrates that these behaviors are not immutable and has implications for the concept of ‘CU traits’ as a subtyping approach for antisocial youth. Indeed, the use of ‘CU behaviors’, ‘CU tendencies’ or ‘interpersonal callousness’ (Pardini et al., 2006) are terms that may better recognize the instability and responsivity to the social environment of this set of affective and socioemotional characteristics.

Further support for the responsivity of CU traits to parenting comes from treatment studies, which show that CU traits improve following parent-focused intervention for antisocial behavior and do not moderate intervention effectiveness. However, the most effective interventions appear to be those with inbuilt flexibility, which enable personalization of treatment components and take into account affective processing characteristics of youth. Finally, the next step in treatment research is likely to involve multi-arm RCTs to dismantle effective interventions, and examine whether specific aspects of interventions or targeting specific dimensions of parenting work best for CU traits versus general antisocial behavior, and any reciprocal associations between these outcomes (see Figures 1f and 1g).

At the same time, more research is needed to identify the dimensions of parenting that are most reliably related to the development of CU traits, and how any associations relate to concurrent and reciprocal development of conduct problems/antisocial behavior. Given the methodological limitations of many of the studies reviewed in this chapter, designs that can use alternative measurement approaches to assess CU traits versus
parenting would represent a useful way to advance the literature. In addition, designs that can more precisely examine the associations between conduct problems, CU traits, and parenting (i.e., their reciprocal cross-sectional and longitudinal effects) would help to determine which aspects of parenting relate to the emergence of antisocial behavior in general versus the specific affective/interpersonal deficits captured by measures of CU traits. Finally, while Chapter 3 reviewed included studies in relation to age of sample, it is clear that both sample age and type are important to findings, but that very few studies develop a priori hypotheses about associations between parenting and CU traits given differences in age of youth or existing/severity level of antisocial behavior. The empirical studies outlined in Chapters 3 and 4 of this thesis attempt to overcome this problem by investigating associations between parenting and CU traits in very young children, as their conduct problems develop, but before they have become entrenched (see Chapter 2, Section 2.6.3).
Chapter 4: Methods
4.1. Thesis Rationale

As reviewed in Chapter 3, a variety of study designs has been employed to assess how parenting relates to CU traits in youth. Commonly, studies have tested whether CU traits moderate the association between parenting and conduct problems, often utilizing a cross-sectional design. Findings from these cross-sectional moderation studies suggest that parenting practices, such as harsh parenting or ineffective discipline, are not consistently related to conduct problems when youth have high concurrent levels of CU traits (e.g., Oxford et al., 2003). However, methodological issues with many studies that have adopted this design make results difficult to interpret. In a second type of design, studies have directly assessed the effect of specific parenting practices on the development of CU traits, aided by prospective and longitudinal designs. The findings from these studies suggest that harsh parenting practices are related to increases in CU traits over time across different samples of youth of different ages (e.g., Fontaine et al., 2011; Hawes et al., 2011; Pardini et al., 2007). In addition, several studies testing direct associations have also highlighted the possibility that positive, affective dimensions of parenting are uniquely related to decreases in CU traits over time (e.g., Pasalich et al., 2011b). Third, a handful of studies have begun to investigate reciprocal parent-child effects in relation to the development of CU traits (e.g., Hawes et al., 2011; Muñoz et al., 2011). Finally, several studies have examined CU traits over time, and whether parenting predicts stability or growth.

The current thesis seeks to add substantially to the current literature in a number of ways. First, very few studies have assessed associations between parenting, CU traits, and conduct problems in early childhood adopting any of the designs outlined above. This gap in the literature is surprising because childhood problem behavior is known to have its
developmental roots in the preschool years (Shaw et al., 2003). In addition, high rates of disruptive behavior during the preschool period are associated with harsh and inconsistent parenting practices (e.g., Bell & Harper, 1977; Johnston & Mash, 2001). Furthermore, there is developmental evidence to support extending the construct of CU traits to preschool children (see Chapter 2). For example, studies that have investigated related concepts, such as empathy (Knafo et al., 2008), guilt (Cornell & Frick, 2007; Kochanska, 2002) and prosocial behavior (Svetlova et al., 2010), suggest that these behaviors mature rapidly from ages 2 to 5, and are influenced by early parenting (e.g., Kochanska, 1997). Furthermore, a handful of recent studies have established the validity of measuring CU behavior in preschool-aged children (Dadds et al., 2005; Hyde et al., 2013; Kimonis et al., 2006a; Willoughby, Waschbusch, Moore, & Propper, 2011).

No studies, however, have examined the stability of CU traits from toddlerhood to middle childhood, nor whether early parenting is a predictor of the development of CU traits across this period. First, the empirical analysis in this thesis is novel because it investigates CU behavior in a younger sample than any previous study, and benefits from assessing the same aged-children at each assessment point at ages 2-4 and at age 9 years old. Annual assessments, with the whole sample at the same age at each time point, enable stronger conclusions to be drawn about associations between parenting, CU behavior, and conduct problems at specific developmental points. The current thesis uniquely investigates if very early parenting differentially predicts CU behavior versus general conduct problems, by separating their measurement and comparing their effects in models. Indeed, being able to draw on a systematic review of evidence to date (see Chapter 3) enables this thesis to clarify and test a number of different designs and related research questions, compare the findings of each, and critically examine the utility of different study designs (see Studies 1-
5). Related to the conclusions of Chapter 3, Chapters 4, 5, and 6 refer to displays of callous unemotionality as ‘CU behavior’ when the current sample is aged 2-4 years old, as the term ‘trait’ seems to imply stability that is inappropriate for this developmental period. In contrast, at age 9, this thesis refers to ‘CU traits’, (a) to enable more direct comparability with previous studies that have investigated displays of callous unemotionality in older samples, and (b) to be in line with the use of the Inventory of Callous Unemotional Traits (Frick, 2004; see Study 4) as the assessment method.

Second, this thesis seeks to address some of the methodological limitations of previous studies that have investigated associations between parenting, CU traits, and conduct problems. As discussed in Chapter 3, previous studies have relied on assessing parenting via parent report. At the same time, studies have also tended to rely on parent reports alone to assess child behavior. This seems particularly problematic when the aspect of the child’s behavior being assessed relates to deficits in affective responding and displays of unemotionality. Specifically, it is not clear how a parent’s rating of the effectiveness of their parenting skills, discipline techniques, or warmth towards their child will affect their subsequent rating of the child’s affective responses. Indeed, there is a significant need for studies to assess one or both parenting and CU behavior with alternative methods to parent report. This thesis is therefore unique in measuring parenting using a number of different methods including multi-informant observed measures of harsh and positive parenting coded from videotaped interactions, expressed measures of parental positive affective attitudes (coded from five minute speech samples), and global ratings of the affective quality of the parent-child relationships from direct observations in the home.

Third, very few studies have considered child effects on the affective quality of the parent-child relationship at very young ages and specifically in relation to CU traits, despite
a large literature that has examined reciprocal parent-child processes in the development of antisocial behavior (Bell & Harper, 1977; Pardini, 2008; Patterson, 1982). Given that the parent is provider of both any potential genetic predisposition for affective or socioemotional processing deficits and the affective quality of the early environment, it is theoretically intuitive that from early ages, a difficult and emotionally unresponsive child would undermine attempts at effective parenting, and particularly parental warmth, by a parent who may share similar traits. As such, Studies 2 and 3 focus on parental emotional expressions, and specifically on positive affective displays. Furthermore, Study 3 uniquely assesses reciprocal and simultaneous effects between parenting, CU behavior, and conduct problems between ages 2-3 years old. Finally, because of the multiple age points, a key strength of studies included in this thesis is the ability to separate out evocative effects of earlier child behavior on parenting. Indeed, being able to control for earlier CU behavior and conduct problems, and compare their contributions to models, provides stronger evidence about whether parenting predicts later CU behavior, or the extent of any association, because it precludes the potential influence of a child’s early patterns of problem behavior on parenting.

4.1.1. Study 1: Do observed positive and harsh parenting predict callous-unemotional behaviors in preschool children?

Study 1 of the thesis investigates the question of whether harsh and positive parenting practices, assessed using observational methods during the preschool period, predict CU behavior. Parenting was assessed using multi-informant observed measures of harsh and positive parenting. As highlighted in Chapter 3, previous studies have been limited by a reliance on parent-reported measures of harsh parenting. Study 1 of this thesis is therefore
unique in investigating direct associations between parenting and CU behavior using multi-informant, multi-method observational measures and assessing both harsh and positive dimensions of parenting (and comparing their unique effects in models). Further, Study 1 is the first study to assess both observed harsh and positive parenting and such a young age (i.e., toddler-aged children).

4.1.2. Study 2: Do callous-unemotional behaviors moderate the association between parental warmth and harshness and the conduct problems of high-risk preschoolers?

Previous studies have focused on the malleability of behavior and responsiveness to parenting among youth with high levels of CU traits. It has been hypothesized that youth with high CU traits are less responsive to parental socialization and discipline efforts. This question has typically been examined using cross-sectional designs, with studies testing the association between parenting and conduct problems at high versus low levels of CU traits (by incorporating an interaction term, ‘parenting × CU traits’, in models). Study 2 of the thesis sought to address five key limitations common to many previous cross-sectional ‘moderator design’ studies, which make it difficult to draw strong conclusions about the nature of associations between parenting, conduct problems and CU traits in samples of youth when this design is adopted as outlined in the systematic review (see Chapter 3).

First, many studies adopting a cross-sectional ‘moderator’ design do not find significant interactions between parenting and CU traits consistently in all models tested, although when effects do occur they appear to receive greater focus within papers. Second, many previous cross-sectional studies have assessed aggressive, male samples with wide age ranges, making it difficult to generalize the findings to normative or high-risk community settings where not all youth have clinical levels of behavior problems.
Furthermore, associations between parenting, conduct problems, and CU traits may differ during specific developmental periods. Third, the majority of previous studies that have adopted a moderator design have typically used parent report for all their measures. If parents have to reflect on their own behavior, including their implementation of different discipline strategies, and then rate affective and interpersonal characteristics of their child, it is unclear how ratings for one may influence the other, making it difficult to interpret studies when parent report is the sole assessment method. Fourth, many previous studies have focused on goal-directed parenting behavior, including monitoring of child behavior or ‘effective discipline’, rather than measures that incorporate parent affect. Given the socioemotional and affective characteristics of children with high levels of CU traits, dimensions of parental affect appear to be a salient target of investigation (see Chapter 3). Indeed, there is some suggestion that parental warmth may be particularly important to CU traits in younger-aged samples of children (e.g., Pasalich et al., 2011b; Pardini et al., 2007).

Finally, although several studies have included a handful of under-fives within samples, no previous studies have tested the question of whether CU traits moderate the importance of affective dimensions of parenting in very early childhood. Indeed, the extension of the construct of CU traits to very young samples seems important for informing interventions for early starting conduct problems at a stage in development when child behavior may be more malleable, and prevention possibilities stronger. At the same time, identifying associations between parenting and CU traits also highlights the potential malleability and responsiveness of these behaviors to important environmental influences, such as parenting, which has implications for the use of ‘trait’ in samples of youth. As noted earlier, the term CU behavior is used to refer to displays of callous unemotionality (rather than CU traits) to reflect the potential malleability and responsivity to the
environment of this set of socioemotional and affective characteristics (see Chapter 3, Section 3.4.3).

The aim of Study 2 of the thesis was therefore to examine the moderating effects of CU behavior on associations between affective dimensions of parenting and child conduct problems during toddlerhood. In doing so, Study 2 of the thesis sought to replicate and extend the divergent findings reported on by Pasalich et al. in relation to parental warmth versus harshness (see Chapter 3), and further examine the malleability of CU behavior and conduct problems among very young children. The measures used were, (a) similar dimensions of observed parenting to those investigated by Pasalich et al. in an attempt to replicate their findings in a younger and larger sample, and, (b) parent reports of affective dimensions of parenting to enable comparison of results using alternative measurement approaches. Based on the extant literature, it was hypothesized that CU behavior would moderate cross-sectional associations between parenting and conduct problems, specifically that, (a) parental harshness (observed and parent-reported) would be more strongly and positively related to concurrent child conduct problems in children with low levels of CU behavior at age 3, and (b) parental warmth (coded from speech samples and parent-reported) would be more strongly and negatively associated with conduct problems in children with high levels of CU behavior at age 3. The only two studies that have investigated moderation of the longitudinal association between parenting and conduct problems by CU behavior (Hyde et al., 2013; Pardini et al., 2007) found no significant effects of the CU behavior × parenting interaction term on later conduct problems. As such, it was hypothesized that CU behavior in this study would not moderate the longitudinal prediction of later conduct problems by the affective dimensions of parenting.
4.1.3. Study 3: Bidirectional associations between dimensions of parental warmth, callous-unemotional behaviors and conduct problems in high-risk preschoolers.

Study 3 of the thesis sought to address the fact that very few studies have considered child effects on the affective quality of the parent-child relationship specifically in relation to CU traits. Furthermore, Study 3 sought to build on the design adopted in Study 2, where associations between conduct problems, parenting, and CU behavior were considered in the same model. While the design of Study 2 gives some indication of how parenting might be uniquely related to conduct problems at different levels of CU behavior, no previous studies have tested reciprocal and simultaneous effects models in which CU traits, parenting, and conduct problems predict each other across more than one time point, controlling for their concurrent overlap, and having multiple, rather than single, outcomes. A reciprocal effects model may be particularly useful in relation to the development of CU traits and associations with affective dimensions of parenting. Specifically, it seems intuitive that an emotionally unresponsive child, who contributes little warmth to parent-child interactions, may begin to undermine parental displays of warmth over time.

Study 3 of this thesis therefore sought to contribute to the literature about associations between early manifestations of CU traits, conduct problems, and positive parental affect in very young children in a number of ways. First, reciprocal associations between parental warmth and child behavior were assessed in a younger-aged sample than any previous studies. Second, unlike any previous studies, observed measures of parental warmth were used to examine reciprocal associations. Third, a particular strength of Study 3 of this thesis was that models tested the effects of parenting on child behavior, while simultaneously testing the evocative effects of child behavior on parenting. Finally, the question of whether parental warmth is uniquely related to the early development of
affective and empathic deficits (as indexed by CU behaviors) versus conduct problems in general was tested, while simultaneously assessing whether child CU behaviors versus conduct problems are predictive of parental warmth.

4.1.4. Study 4: Factor structure of the Inventory of Callous-unemotional traits among high-risk 9 year olds

In Studies 1-3, a measure of CU behavior was used that was derived from items drawn from two general child behavior questionnaires (see Section 4.4.1). While this ‘home grown’ approach has been adopted widely in the study of CU traits among younger samples of children (e.g., Hawes & Dadds, 2005; Viding et al., 2009), recently a fuller and more precise measure of CU traits has also been developed. Specifically, the Inventory of Callous and Unemotional Traits (ICU; Frick, 2004) is a 24-item measure, developed to assess multiple aspects of the affective and interpersonal features of psychopathy in youth. It was developed from the APSD, but was designed to overcome many well-documented limitations associated with the APSD (Kotler & McMahon, 2010), including a small number of items and narrow range of responses, which have been argued to contribute to moderate internal consistency found for the CU traits subscale in many studies (see Chapter 3). In the development of the ICU, four of the original six APSD CU traits items, which have previously been found to consistently load onto a ‘CU traits factor’ in community and clinical samples, were used: ‘I care about how well I do at school or work’, ‘I feel bad or guilty when I do something wrong’, ‘I do not show my emotions to others’, ‘I am concerned about the feelings of others’. Next, the developers added a further three positively- and three negatively-worded items for each item to form a total pool of 24 items, with four theorized subscales (careless, callous, unemotional and uncaring). Each
item is rated by parent, teacher, or youth on a 4-point scale (0, not true at all; 1, somewhat true; 2, very true; 3, definitely true).

In recent work, the factor structure of the ICU has been examined by studies employing both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Across various samples of youth, although with a focus on adolescents, the ICU has most consistently been shown to fit a three-Bifactor model (with limited psychometric support for the original proposal of a four-factor model). A three-Bifactor model assumes that a portion of the variance in each item is attributable to a general CU traits factor, and another portion attributable to one of the three uncorrelated factors (callousness, uncaring, or unemotional). This type of model has traditionally been used in the intelligence literature (e.g., Carroll, 1993), but has more recently been applied to adult psychopathy research (Patrick, Hicks, Nichol, & Krueger, 2007).

In an early study, Essau, Sasagawa, and Frick (2006) employed CFA to examine the factor structure of the ICU in a non-referred sample of German adolescents ($N = 1443$, aged 13-18 years old). Items of the ICU were found to load onto three subfactors: callousness (having a callous attitude towards others), uncaring (a lack of caring about one’s own performance), and unemotional (having a lack of emotional expression), while simultaneously loading onto a ‘general CU factor’, thereby fitting the three-Bifactor model. Table 8 summarizes the items included in the parent-reported form of the ICU, including the three proposed subfactors. The three-Bifactor factor structure has subsequently been replicated in studies investigating the ICU among American adolescent offenders (Kimonis, Frick, Muñoz, & Aucoin, 2008b; $N = 248$), a community sample of Dutch adolescents (Roose, Bijttebier, Decoene, Claes, & Frick, 2010), and non-referred Greek Cypriot adolescents (Fanti, Frick, & Georgiou, 2009; $N = 347$). These results have been the
justification for which studies use individual subscale or total ICU scale scores in analyses (Essau et al., 2006).

**Table 8: Items of the parent-reported form of the ICU (Frick, 2004) and subfactors identified in previous studies (e.g., Essau et al., 2006; Kimonis et al., 2008b)**

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
<th>Subfactor</th>
<th>Item number</th>
<th>Item</th>
<th>Subfactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>He/she expresses his/her feelings openly*</td>
<td>Unemotional</td>
<td>13</td>
<td>He/she easily admits to being wrong*</td>
<td>Uncaring</td>
</tr>
<tr>
<td>2</td>
<td>What he/she think is right/wrong is different from what other people think</td>
<td>Callousness</td>
<td>14</td>
<td>It is easy for others to tell how he/she is feeling*</td>
<td>Unemotional</td>
</tr>
<tr>
<td>3</td>
<td>He/she cares about how well he/she does at school or work*</td>
<td>Uncaring</td>
<td>15</td>
<td>He/she always try his/her best*</td>
<td>Uncaring</td>
</tr>
<tr>
<td>4</td>
<td>He/she does not care who he/she hurts to get what he/she wants</td>
<td>Callousness</td>
<td>16</td>
<td>He/she apologizes to persons he/she hurts</td>
<td>Uncaring</td>
</tr>
<tr>
<td>5</td>
<td>He/she feels bad or guilty when he/she does something wrong*</td>
<td>Uncaring</td>
<td>17</td>
<td>He/she tries not to hurt others’ feelings*</td>
<td>Uncaring</td>
</tr>
<tr>
<td>6</td>
<td>He/she does not show his/her emotions to others</td>
<td>Unemotional</td>
<td>18</td>
<td>He/she doesn’t feel remorseful when he/she does something wrong</td>
<td>Callousness</td>
</tr>
<tr>
<td>7</td>
<td>He/she does not care about being on time</td>
<td>Callousness</td>
<td>19</td>
<td>He/she is very expressive and emotional*</td>
<td>Unemotional</td>
</tr>
<tr>
<td>8</td>
<td>He/she is concerned about the feelings of others*</td>
<td>Callousness</td>
<td>20</td>
<td>He/she does not like to put the time into doing things well</td>
<td>Callousness</td>
</tr>
<tr>
<td>9</td>
<td>He/she does not care if he/she gets into trouble</td>
<td>Callousness</td>
<td>21</td>
<td>The feelings of others are unimportant to him/her</td>
<td>Callousness</td>
</tr>
<tr>
<td>10</td>
<td>He/she does not let his/her feelings control him/her</td>
<td>Callousness</td>
<td>22</td>
<td>He/she hides his/her feelings from others</td>
<td>Unemotional</td>
</tr>
<tr>
<td>11</td>
<td>He/she does not care about doing things well</td>
<td>Callousness</td>
<td>23</td>
<td>He/she works hard on everything he/she does*</td>
<td>Uncaring</td>
</tr>
<tr>
<td>12</td>
<td>He/she seems very cold and uncaring to others</td>
<td>Callousness</td>
<td>24</td>
<td>He/she does things to make others feel good*</td>
<td>Uncaring</td>
</tr>
</tbody>
</table>

* Items that require reverse scoring before calculation of the total score

However, recent studies have complicated the picture. For example, Houghton et al. (2012) examined the ICU in a sample of preadolescent children (N = 268, aged 7-12).

Children were randomly selected from each of Grades 3-7 within two separate primary schools in the metropolitan area of Perth, Australia. Schools were selected to be
representative of low and middle socioeconomic status areas. Model fit indices from CFA analyses showed mixed support for the three-Bifactor model. A two-factor model, comprising an uncaring and callous-unemotional factor fit the data best. In addition, it was necessary to correlate error terms of various pairs of items to improve model fit, for example, ‘I do not care if I get into trouble’ and ‘I do not care about being on time’ were correlated. The authors speculated that the younger age of some children may have meant that they were not of an age where they could ‘feel’ the emotions of others. However, because of the age range of the sample, it is difficult to draw any strong conclusions about the effect of any one specific developmental point or age on ICU factor structure. In a second and more recent study, Feilhauer, Cima, and Arntz (2012) investigated the psychometric properties of the ICU among Dutch youth aged 13-20 years, including clinical offenders (detained, n = 127), healthy controls (community, n = 172), non-clinical offenders (not detained, n = 42) and an externalizing non-offender group (under treatment for behavioral problems, n = 42). The results suggested a five-factor solution fitted the data best, including the following subscales: ‘lack of conscience’, ‘uncaring’, ‘unemotional’, ‘callousness’ and ‘lack of empathy’.

In addition to these recent results that do not fit the three-Bifactor solution, there are several methodological caveats that need to be considered in relation to the findings of previous studies. First, the fit indices for the three-Bifactor model across many previous studies are often only just acceptable and the reliability of the three subscales obtained adopting this three-Bifactor structure is inconsistent. In particular, the ‘unemotional’ subscale has been found to show only marginally acceptable internal consistency (e.g., Essau et al., 2006). However, the small number of items in this subscale (n = 5) may contribute to lower internal consistency. Second, to ensure better fitting factor models,
studies have had to increase the number of correlated error terms, which may be sample dependent. Third, individual items have commonly been deleted to improve better fitting models. For example, removal of item 2 (‘what he/she think is right and wrong is different from what other people think’) and item 10 (‘he/she does not let his/her feelings control him/her’) significantly improved model fit for a three-Bifactor solution (Houghton et al., 2012; Kimonis et al., 2008b). Fourth, the three-Bifactor model requires that items load onto three independent, uncorrelated subfactors, while simultaneously loading onto a general CU factor. However, in several previous studies, the ‘uncaring’ items have been found to load well onto the general factor, whereas the ‘callousness’ and ‘unemotional’ items only load slightly onto the general factor, thus violating the assumptions of the specified model (e.g., Fanti et al., 2009; Kimonis et al., 2008b). Finally, although there are 12 positively-worded and 12 negatively-worded items distributed across the ICU, the callousness subscale is largely comprised of negatively worded items, whereas the uncaring subscale comprises positively-worded items. This trend has raised concerns that the factor structure obtained for the ICU is, in fact, a reflection of method variance, rather than construct variance (see Burke, 1999).

The aim of Study 4 of this thesis was to investigate the factor structure of the ICU in a mixed-sex and high-risk sample of 9 year old children, using CFA. Study 4 of this thesis is unique in examining the ICU in a preadolescent sample of children of the same age/developmental period (all age 9 years old). A particular strength of this thesis is that Study 4 examines the factor structure of the ICU in the same sample in which CU behavior was measured in at ages 2-4 (Studies 1-3). Second, the sample is assessed when children are all the same age, enabling precise conclusions to be drawn about the factor structure of the ICU at a specific developmental point. Furthermore, the current sample, while high risk,
does not display the uniformly high level of behavior problems of many of the clinic-
referred/forensic samples assessed in previous studies. Indeed, it may be particularly useful
to assess the structure of the ICU among different types of samples, as underlying
dimensions may be different when children do not have clinically diagnosable problem
behavior. Parent reports on the ICU are assessed, which differs from previous studies,
many of which use youth report. For the current sample, the use of parent reports may
address the possibility that even by age 9, children are not fully aware of how their
behavior relates to the feelings or perspectives of others (Houghton et al., 2012).

4.1.5. Study 5: The influence of early child behavior and parenting on age 9 callous-
unemotional traits among high-risk children

Study 5 investigated the prediction of CU traits at age 9, using the recently-developed and
fuller measure of CU traits, the Inventory of Callous-Unemotional Traits (ICU; Frick,
2004), (factor structure assessed in Study 4 of this thesis) and using the same sample as
Studies 1-4. By having this assessment of CU traits at age 9, Study 5 was able to address
two key questions about the development of CU behaviors. First, Study 5 of this thesis
uniquely investigated whether CU behavior in early childhood (using the CU behavior
measure for ages 2-4 years old derived for this thesis and investigated in Studies 1-3; see
Chapter 4, Section 4.4.1) are prognostic of later CU traits. While previous studies have
examined the stability of CU traits over time (across 1, 4, and 9 year periods), no studies
have investigated the association between early displays of CU behavior among preschool
children with CU traits later in childhood/early adolescence, or how these relate to the
development of conduct problems. Indeed, studies investigating the stability of CU traits
have tended to assess adolescent male samples over short time intervals, with high existing
levels of conduct problems (Andershed, 2010). Furthermore, when studies investigate stability, there appear to be significant fluctuations in the level of youth CU traits (see Chapter 3). Second, Study 5 investigated the influence of early parenting on later CU traits, over and above earlier child behavior (CU behavior and conduct problems).

4.2. Sample details

4.2.1. Participants and recruitment

Recruitment took place between 2002 and 2003. The sample was drawn from the three geographically and culturally diverse regions in the USA, comprising urban Pittsburgh, PA, semi-urban Eugene, OR, and rural Charlottesville, VA. Families were contacted because they were clients in a universally-offered, national family nutrition and health program for young, low-income parents, referred to as the Women, Infants and Children Nutrition Program (WIC). Families were invited to participate in the study if they had a son or daughter between age 2 years 0 months and 2 years 11 months, and if they met initial screening criteria of having socioeconomic, family and/or child risk factors for future behavior problems. Families were judged to meet eligibility criteria if they scored 1SD above normative averages in two or more of the following domains: (a) child behavior (e.g., conduct problems or high-conflict relationships with adults), (b) family problems (e.g., maternal depression or substance-use problems), and (c) sociodemographic risk (e.g., low income, relevant to WIC criterion). Figure 3 summarizes the recruitment and assessment protocol. Randomization and allocation to the different arms of the intervention are also shown in 3.1. A pool of 1666 families from WIC sites had children in the
appropriate age range across the three geographical regions. Of these families, 879 met the eligibility criteria, and 731 agreed to participate in the study.

**Figure 3: Overview of recruitment, assessment, randomization to intervention protocol, and retention of participants from 2-4 years old (adapted from Dishion et al., 2008)**

<table>
<thead>
<tr>
<th>Study candidates screened (N=1666)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study candidates qualified (N=879)</td>
</tr>
<tr>
<td>Study candidates participated (N=731)</td>
</tr>
<tr>
<td>Randomized to control condition age 2 (N=364)</td>
</tr>
<tr>
<td>Control condition age 3 (N=330)</td>
</tr>
<tr>
<td>Control condition age 4 (N=310)</td>
</tr>
<tr>
<td>Randomized to intervention condition age 2 (N=367)</td>
</tr>
<tr>
<td>Intervention condition age 3 (N=332)</td>
</tr>
<tr>
<td>Intervention condition age 4 (N=317)</td>
</tr>
</tbody>
</table>

**4.2.2. Ethical approval**

During the first home assessment, researchers reviewed a comprehensive consent form with the primary caregiver. Families were informed about the reason for conducting the research, source of funding, procedures, risks and benefits, payment, right to withdraw, and confidentially. Regarding confidentiality, participants were informed that they would not be identified by name in any publication of research. Families received $100 for participating in age 2 home visits. This payment increased by $10 for every subsequent annual assessment. Ethical approval for the project and secondary data analysis was granted by the Institutional Review Board at the institutions affiliated with the project in the United States and CUREC at University of Oxford.
4.2.3. Characteristics of participants

Of the 731 families, 272 (37%) were recruited in Pittsburgh, 271 (37%) in Eugene, and 188 (26%) in Charlottesville. The sample was culturally diverse and across sites, primary caregivers self-identified as belonging to the following ethnic groups: 28% African American, 50% European American, 13% biracial, and 9% other groups. During the initial recruitment period, over 66% of families across sites had an annual income of less than $20,000. The majority of primary caregivers were biological mothers (96% at age 2 and 3). Children lived with both of their biological parents (37%), a single/separated parent (42%), or a cohabiting single parent (21%). The average number of family members per household across sites was 4.5 ($SD = 1.63$). Finally, 41% of primary caregivers had a high school diploma. Recruitment descriptives for the total sample and by study site are summarized in Table 9.
Table 9: Recruitment descriptives by study site (adapted from Dishion et al., 2008)

<table>
<thead>
<tr>
<th>Race (%)</th>
<th>Pittsburgh</th>
<th>Eugene</th>
<th>Charlottesville</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>50.4</td>
<td>1.5</td>
<td>33.5</td>
<td>27.9</td>
</tr>
<tr>
<td>European American</td>
<td>38.1</td>
<td>70.0</td>
<td>39.4</td>
<td>50.1</td>
</tr>
<tr>
<td>Biracial</td>
<td>10.0</td>
<td>23.5</td>
<td>15.4</td>
<td>13.0</td>
</tr>
<tr>
<td>Other</td>
<td>1.5</td>
<td>5.0</td>
<td>11.7</td>
<td>8.9</td>
</tr>
<tr>
<td>Target child age, M (SD)</td>
<td>28.3 (3.49)</td>
<td>28.5 (2.91)</td>
<td>27.7 (3.43)</td>
<td>28.2 (3.28)</td>
</tr>
<tr>
<td>Target child gender (% female)</td>
<td>49.6</td>
<td>49.8</td>
<td>48.9</td>
<td>49.5</td>
</tr>
<tr>
<td>Annual family income &lt; $20,000 (%)</td>
<td>70.5</td>
<td>62.5</td>
<td>66.0</td>
<td>66.3</td>
</tr>
<tr>
<td>Family members per household, M (SD)</td>
<td>4.4 (1.55)</td>
<td>4.5 (1.67)</td>
<td>4.6 (1.66)</td>
<td>4.5 (1.63)</td>
</tr>
<tr>
<td>Education (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school diploma</td>
<td>42.5</td>
<td>39.5</td>
<td>40.0</td>
<td>41.0</td>
</tr>
<tr>
<td>1-2 years post-high school</td>
<td>35.7</td>
<td>34.7</td>
<td>25.5</td>
<td>32.7</td>
</tr>
</tbody>
</table>

4.2.4. Retention and attrition

Of the 731 families who initially participated, 659 (90%) were available at the 1-year follow up when children were aged 3. At the 2-year follow-up, when children were aged 4 years old, 619 (85%) participated (also see Figure 3). Selective attrition analyses comparing age-2 study variables for participants retained versus attrited at ages 3, 4, 5, and 7.5 have revealed no significant differences with respect to project site, children’s race, ethnicity, or gender, maternal depression, daily hassles/family stress, parent education, children’s externalizing behavior, or intervention status (also see Brennan, Shaw, Dishion, & Wilson, 2012; Dishion et al., 2008). Finally, the majority of analyses were run in Mplus 6.0 (Muthen & Muthen, 2010) with a full information maximum likelihood (FIML) approach (for more details, see Analytic Strategy in Chapter 4, Section 4.5). FIML efficiently
accommodates missing data and provides less biased estimates than listwise or pairwise deletion in SPSS (Schafer & Graham, 2002). Using FIML procedures, the analyses for Studies 1-5 therefore included using all participants except when they were missing data on an independent predictor that cannot be estimated with missingness (e.g., a covariate, such as income or parent education) or a moderator variable (see Study 2).

Across the development of measures (outlined below) and throughout the analyses conducted for Studies 1-5 (see Chapter 5), model fit was evaluated as relevant using Comparative Fit Index (CFI), Tucker Lewis index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Residual (SRMR). For CFI and TLI, acceptable fit was defined using the conventional definition of values between .90-.94, with values ≥ .95 taken to indicate good fit (Bentler, 1990; Hu & Bentler, 1999). RMSEA and SRMR values between .05-.10 were taken to indicate acceptable fit, and values of ≤ .05 to indicate a good fit (Browne & Cudeck, 1993; McDonald & Hu, 2002).

4.2.5. Description of the Family Check-Up Intervention

While an evaluation of the Family Check-Up (FCU) Intervention is not the focus on this thesis, an overview of what it entails is useful to set the context for the five studies that are included. The FCU intervention was designed as a preventative intervention for use in high-risk environments and to address normative challenges facing parents from toddlerhood onwards (Gill, Hyde, Shaw, Dishion, & Wilson, 2008). The FCU comprises three components, which set it aside from traditional clinical models. First, it is based on a health maintenance model, promoting periodic contact with families and regular follow-up to prevent family problems developing. Second, the FCU provides feedback to families following a structured and comprehensive assessment. Families are given detailed
information about child, family, and community risk factors, to promote behavior change. Within assessments, parenting practices are a key focus through the use of both direct observation and videotaping of structured and semi-structured parent-child tasks. Such detailed assessments enable the intervention to be personalized and flexible according to specific needs and problems of individual families. Third, the FCU emphasizes change by incorporating motivational interviewing and family management practices (Forgatch, Patterson, & DeGarmo, 2005).

The intervention itself works in a number of different ways depending on the specific needs of families, which are identified during the ‘get to know you’ and subsequent feedback sessions. As such, the number of therapy sessions, type of session, and very nature of the intervention differs between individual families. Parent consultants may provide referrals for help with problems outside parenting (e.g., language development) or work directly with families on issues depending on his/her expertise (e.g., marital therapy, postpartum depression). For most families however, the core of this brief intervention addresses family management skills and parenting practices (Dishion et al., 2008; Gill et al., 2008). The intervention incorporates parent management training techniques, which are based on social learning principles and modeling (e.g., Forgatch et al., 2005; Patterson, 1982; Webster-Stratton & Hammond, 1997), and have been linked to improvements in parenting and reductions in child conduct problem (Patterson, Reid, & Dishion, 1992). Parent-management training targets skills in the domains of limit setting, proactive parenting, positive reinforcing, and relationship building. In the FCU, parent consultants introduce parents to these techniques via explanation of new skills followed by in-session practice, role plays and practice with their child, and video feedback of assessment sessions.
Randomization to the control or intervention group took place after the initial age 2 assessments (see Figure 3). The randomization sequence was computer generated by a member of staff who was not involved in recruitment, and was gender-balanced to ensure an equal number of males and females in both groups. Examiners involved in follow-up home assessments from age 3 onwards were not informed of families’ randomly assigned condition. Of the families assigned to the intervention condition, 77.9% participated in the initial interview and feedback sessions at age 2, and 65.4% participated at age 3. Of those families who met with a parent consultant, the average number of sessions at age 2 per family was 3.32 ($SD = 2.84$). The number of sessions was uncorrelated with problem behavior after controlling for initial levels.

Research staff and parent consultants who conduct the FCU are PhD and Master’s-level service workers, all of whom have previous experience in conducting family-based interventions. Parent consultants are of diverse ethnic status, including Latino, African-American and European-American. Training takes place over a period of three months, using a combination of strategies including didactic instruction and role playing. Parent consultants are certified by lead consultants at each site, who themselves are certified by the intervention developer. Certification is established by reviews of videotaped feedback sessions with families and follow-up intervention sessions. Videotape reviews are repeated annually with parent consultants to reduce intervention drift, and enhance fidelity to parent management training. Cross-site case reviews are conducted weekly via video-conferences to further enhance fidelity (Dishion et al., 2008).

The intervention has been shown improve parent and child functioning in a number of domains. First, reductions in child problem behavior from ages 2-4 were found to be mediated via improvements in positive parenting practices from ages 2-3 (Dishion et al.,
Second, improvements in parental positive behavior support from ages 2-3 by parents in the intervention group was found to promote children’s inhibitory control and language development from age 3-4 years old (Lunkenheimer et al., 2008). Third, there was an intervention effect on reductions in maternal depression from ages 2-3 years old, which mediated improvements in both child externalizing and internalizing problem behavior after accounting for the potential mediating effects of improvements in positive parenting (Shaw, Connell, Dishion, Wilson, & Gardner, 2009). However, as an evaluation of the effectiveness of the intervention is not the focus on this thesis, intervention status (control versus intervention group) is used as a covariate in analyses.

4.2.6. Procedures

To optimize the internal validity of the study (i.e., to prevent differential drop out for experimental and control conditions), initial assessments were completed before random assignment to intervention or control group took place (see Figure 3). Initial assessments were conducted by research staff during home visits. Each assessment began by introducing children to an assortment of age-appropriate toys, and having them play for 15 minutes while mothers completed questionnaires. After the free play, mother and child participated in a clean-up task (5 minutes), followed by a delay of gratification task (5 minutes), four teaching tasks (3 minutes each), a second free play period (4 minutes), a second clean-up task (4 minutes), the presentation of two inhibition-inducing toys (2 minutes each), and a meal preparation task (2 minutes). The tasks took, in total, approximately 40-50 minutes to complete across all families. As such, variables derived from coding of videotapes were standardized according to total time (i.e., divided by total time to create ‘duration proportion’ scores). After the visit, research staff also completed questionnaires evaluating
the home and parenting environment. A similar home-visit and video-taped observation protocol was repeated annually from ages 2-9 years old for both the control and intervention groups, with some age-appropriate adjustments made to tasks and questionnaires.

4.3. Existing measures in the Early Steps Framework used in thesis

4.3.1. Demographic measures

A demographics questionnaire was administered annually at the start of every home assessment. The measure included questions about family structure, parental education and income, parental criminal history and areas of family stress.

4.3.2. Parental characteristics

First, parental depressive symptoms were measured at ages 2 and 3 using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), a well-established and widely used 20-item measure of depressive symptomatology. Parents reported the frequency of their experiencing various depressive symptoms in the past week on a scale from 0 (less than a day) to 3 (5–7 days), and their scores for each item were summed (age 2, $\alpha=.76$; age 3, $\alpha=.75$). Second, parents completed the frequency subscale of the Parenting Daily Hassles (PDH) at ages 2 and 3. The PDH assesses typical stressors uniquely facing parents and is associated with child behavior outcomes to a greater degree than more global life stresses (Crnic & Greenberg 1990). Parents rated each of the 20 items on a 4-point Likert scale based on how frequently the hassles occurred (i.e., rarely to constantly), including the frequency of feeling that they were ‘always cleaning up messes of toys or...
food’ or ‘having to change plans because of unexpected child needs.’ Scores for each item were summed (age 2, \( \alpha = .76 \); age 3, \( \alpha = .82 \)).

### 4.3.4. Early childhood problem behavior measures

Conduct problems/early indicators of general externalizing behavior problems were assessed using three different measures. First, the Problem Behavior Factor of the Eyberg Child Behavior Inventory (ECBI; Robinson, Eyberg, & Ross, 1980) was given to parents to complete. The ECBI is a 36-item parent-report behavior checklist that assesses conduct problems in children between 2 and 16 years of age via two factors, one that focuses on the perceived intensity of behavior, and another that identifies the degree to which the behavior is a problem for caregivers. Both factors have previously been shown to demonstrate high reliability in the current sample from age 2 to 4 (Intensity factor \( \alpha = .86-.94 \); Problem Behavior factor \( \alpha = .84-.94 \)).

Second, the Child Behavior Checklist for ages 1.5–5 and ages 6–18 (CBCL; Achenbach & Rescorla, 2001) was given to primary caregivers to complete. The CBCL asks parents to rate the validity of several statements regarding potential child behaviors on a 3-point Likert scale in which 0 = not true, 1 = somewhat/sometimes true, and 2 = very true, often true. Ratings of problem behaviors reflect the child’s functioning during the last two months. The CBCL has well-validated and empirically derived scales, developed through factor analyses of data from the general pediatric population (Achenbach & Rescorla, 2001). Various analyses have identified seven first-order factors, which represent separate problematic emotional/behavior syndromes. This includes an Externalizing Factor, which is used in this thesis and captures aspects of aggression and rule-breaking behavior.
and has previously been demonstrated to show high internal consistency in the current sample (age 2, $\alpha=.86$; age 3, $\alpha=.86$; Trentacosta et al., 2008).

Third, a more precise measure of child oppositional and aggressive was developed using just eight CBCL items. To generate a factor of oppositional and aggressive behavior that was both developmentally meaningful in the age 2 through 5 period and clinically relevant, individual items from the CBCL were chosen that mapped onto DSM-IV criteria for aggressive and oppositional behavior, using both oppositional defiant disorder and conduct disorder items. A composite variable, termed ‘aggressive-oppositional behavior’ was computed by averaging the values for these items at each assessment age. Only the eight aggressive-oppositional items that were continuously present on the CBCL across ages 2 through 5 were used. Aggressive-oppositional behaviors in this scale include ‘child is cruel to animals’, ‘child destroys own things’, ‘child destroys others’ things’, ‘child gets in many fights’, ‘child physically attacks people’, ‘child is defiant’, ‘child is disobedient’, and ‘child has temper tantrums’. Alpha reliabilities for the aggressive-oppositional scale were acceptable at all ages (age 2, $\alpha=.71$ age 3, $\alpha=.75$, age 4, $\alpha=.78$ and age 5, $\alpha=.80$; Dishion et al., manuscript in preparation).

4.3.5. Parent-reported parenting measures

First, the affective quality of the parent–child relationship was measured at ages 2 and 3 using the Adult-Child Relationship Scale (ACRS; modified from the Student-Teacher Relationship Scale; Pianta, 2001). The ACRS assesses parental perceptions of the relationship with their child and includes a positivity and conflict scale. The conflict scale assesses parent’s perception of the conflict in the relationship with their child. It consists of 10 items, which the parent rates on a 5-point Likert scale, including, ‘the child and I always
Parents’ scores for each of the 10 conflict items were summed and there was good internal consistency at both ages (age 2, $\alpha=.75$; age 3, $\alpha=.84$). The 5-item positive subscale assesses a parent’s positive feelings towards the child and attachment-related behavior, tapping into multiple distinct characteristics of the affective quality of the parent-child relationship (Ingoldsby, Shaw, & Garcia, 2001). Parents’ scores for each item were summed and there was good internal consistency at both ages (age 2, $\alpha=.61$; age 3, $\alpha=.65$). Parent reports on both the conflict and positive subscales have been shown to predict later antisocial behavior and social skills in this sample (Trentacosta et al., 2011).

Second, parent-reported harshness was assessed using the over-reactivity subscale of the Parenting Scale at ages 2 and 3 (Arnold, O’Leary, Wolff, & Acker, 1993). The Parenting Scale is a 30-item self-report measure of parenting practices made up of three factors (overreactivity, laxness, and verbosity). The 10-item overreactivity subscale assesses harsh discipline, including reports of displaying anger and irritability (e.g., ‘when my child misbehaves, I spank, grab, or hit him/her.’). Each item is rated on a 1–7 scale. In the current sample, alphas were modest (age 2, $\alpha=.56$; age 3, $\alpha=.58$) and harsh parenting was also examined using an observational measure (see Section 4.3.6).

### 4.3.6. Observed parental harshness

Observed harsh parenting was defined and validated at ages 2 and 3 as a multi-dimensional factor, incorporating general parenting qualities (e.g., overall harshness) and specific parental behaviors (e.g., negative comments) (Moilanen, Shaw, Dishion, Gardner, & Wilson, 2010), using two coding methods. First, a team of undergraduates, blind to families’ intervention status, coded videotaped family interaction tasks using the
Relationship Process Code (RPC; Jabson, Dishion, Gardner, & Burton, 2004). RPC inter-rater reliability was calculated using Noldus Observed Pro 5.0 software based on the duration of each micro-social behavior. To reach acceptable reliability, coders had to achieve 70% agreement and $kappa = .70$ on two consecutive training assignments, which had been coded by a ‘master coder’. Fifteen percent of videotapes were coded twice, with acceptable agreement (average team percent agreement = .87; $kappa = .86$). The three RPC codes used in the observed harsh parenting construct were the duration proportions of a summary score of parental negative verbal, directive, and physical behavior.

Following the micro-social coding, coders completed a macro-social rating scale on the same-videotaped interactions using the Coder Impressions Inventory (Dishion, Hogansen, Winter, & Jabson, 2004). Negative parenting behavior was assessed by six items: parent ‘gives developmentally inappropriate reasons for desired behavior change,’ ‘displays anger/frustration,’ ‘criticizes/blames child for family problems,’ ‘uses physical discipline,’ ‘actively ignores/rejects the child’ and ‘makes statements/gestures indicating child is worthless.’ The three RPC and six macro-ratings were standardized and summed to create a composite index of observed harsh parenting ($\alpha = .75$; Moilanen et al., 2010).

4.4. Newly derived measures for thesis

4.4.1. Callous-unemotional behavior

To derive the measure of CU behavior at ages 2, 3, and 4, the current thesis built on and developed the strategy and measurement approach adopted in a previous validation paper
using the same sample (Hyde et al., 2013). Items were drawn from parent reports on the CBCL and ACRS (see previous section), which reflected aspects of a lack of guilt, a lack of affective behavior, and callousness, and that were related to the construct of CU traits. In particular, items were chosen that were similar to those on the CU traits scale of the APSD (Frick & Hare, 2002), or the ICU (Frick, 2004), and with minimal overlap with externalizing behavior or general conduct problems (see Chapter 2). Based on the aim of developing an early measure of CU traits, five theoretically appropriate items were tested in a CFA in Mplus 6.0 (Muthen & Muthen, 2010). Two CBCL items, because of their importance to the construct of CU traits (‘child is unresponsive to affection’ and ‘child shows little affection’) were combined into one ‘low affective behavior’ item, to increase variance in score.

The proposed CU behavior latent construct therefore included five indicators at each time point: (a) ‘the child acts sneakily or tries to get round me’ (ACRS); (b) ‘the child doesn’t seem guilty after misbehavior’ (CBCL); (c) ‘punishment doesn’t change the child’s behavior’ (CBCL); (d) ‘the child is selfish or won’t share’ (CBCL); (e) ‘the child has low affective behavior (two CBCL items combined). The measurement model of CU behavior from ages 2-4 is shown in Figure 3.2. The model was a good fit to the data, $\chi^2(72, N = 731) = 106.61, p < .01; \text{CFI}=.98; \text{TLI}=.97; \text{RMSEA}=.03; \text{SRMR}=.03$. CU behavior was moderately stable over time and factor loadings were moderate (Figure 4) and significant at the $p < .001$ level. All correlations between items over time were moderate (range, $r = .13-.43$) and significant at the $p < .01$ level, with the exception of the cross-time correlation

---

5 There are a number of key differences in the item content (including dropping of the item ‘child lies’) and analytic approach (including factor analysis testing one- versus two-factor structure of CU behavior versus aggressive-oppositional behavior) between the development of the CU behavior measure in the current thesis and the development of a measure of deceitful-callous behavior developed by Hyde et al. (2013). Nevertheless, the measurement approach of this thesis directly builds on work of Hyde et al. and the work of this earlier paper is therefore explicitly acknowledged.
between ‘doesn’t feel guilty after misbehavior’ at ages 2 and 4 ($r = .08, p = .10$) and between ‘punishment doesn’t change behavior’ at ages 2 and 4 ($r = .04, p = .40$).

**Figure 4: Measurement model of child callous-unemotional behavior from ages 2-4**

A series of analyses was carried out to test the reliability and validity of the CU behavior measure. First, Cronbach’s alphas for items at each age were computed in SPSS (vs. 18.0), indicating moderate-low internal consistency at age 2 ($\alpha = .56$), and improved,
acceptable internal consistency at ages 3 ($\alpha=.62$) and 4 ($\alpha=.62$). The alphas in this very young sample for the measure of CU behavior are comparable to those found for measures of CU traits for older samples of children (e.g., Frick et al., 2003a; Hipwell et al., 2007) and adolescents (e.g., Muñoz et al., 2011). The five items were summed at each age, to create a CU behavior composite score at ages 2, 3, and 4. Descriptive statistics and correlations between CU behavior scores at each age are shown in Table 10. CU behavior demonstrated stability over time (range in $r = .41-.56, p < .001$).

Table 10: Descriptive statistics and stability of CU behavior measure ages 2-4

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>M</th>
<th>SD</th>
<th>CU behavior age 3</th>
<th>CU behavior age 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU behavior age 2</td>
<td>722</td>
<td>.00</td>
<td>10.00</td>
<td>3.85</td>
<td>2.03</td>
<td>.46***</td>
<td>.41***</td>
</tr>
<tr>
<td>CU behavior age 3</td>
<td>654</td>
<td>.00</td>
<td>9.00</td>
<td>3.01</td>
<td>1.93</td>
<td></td>
<td>.56***</td>
</tr>
<tr>
<td>CU behavior age 4</td>
<td>625</td>
<td>1.00</td>
<td>13.00</td>
<td>5.12</td>
<td>2.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001.

Second, the association of CU behavior with broader externalizing behavior was assessed. This analysis was carried out to enable comparability with the results of previous studies that have examined CU traits in similar aged and older samples of children (e.g., Hawes & Dadds, 2005; Willoughby et al., 2011) and to test the original conceptualization of core psychopathy features versus antisocial behavior in general (see Chapter 2). A series of CFAs were conducted in which the 5 items from the CU behavior measure and the 8 items from the aggressive-oppositional behavior measure (see Section 4.3.4) were loaded onto one ‘externalizing’ factor or two separate factors (CU behavior versus aggressive/oppositional symptoms) and their fits compared. The 2-factor model fit the data significantly better at age 2 ($\chi^2$ difference = 35.05, $df = 1, p < .05$), age 3 ($\chi^2$ difference = 6.02, $df = 1, p < .05$), and at age 4 ($\chi^2$ difference = 7.63, $df = 1, p < .05$). These analyses
suggest that the items included in the 2-factor solution were tapping two distinct constructs (e.g., CU behaviors versus aggressive-oppositionality).

Third, a variety of different analyses indicated that the measure of CU behavior reliably identified a more severe subgroup of children with early-starting conduct problems. Table 11 presents zero-order correlations between CU behaviors at ages 2-4 with problem behavior (indexed by the Problem Factor of the ECBI and the Externalizing factor of the CBCL; see above) at these same ages. Using either the parent or an alternative caregiver (e.g., grandmother or father) as an informant on the measure of problem behavior, there were moderate-strong cross-sectional and longitudinal correlations within and across informant.

Table 11: Zero-order correlations between CU behavior (ages 2-4) and problem behavior ages 2-4 (Eyberg Problem Factor and CBCL Externalizing factor) reported on by parents and an alternative caregiver

<table>
<thead>
<tr>
<th></th>
<th>Age 2 (P)</th>
<th>Age 3 (P)</th>
<th>Age 4 (P)</th>
<th>Age 2 (A)</th>
<th>Age 3 (A)</th>
<th>Age 4 (A)</th>
</tr>
</thead>
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<tr>
<td>CU beh</td>
<td>.31***</td>
<td>.17**</td>
<td>.28***</td>
<td>.13*</td>
<td>.26***</td>
<td>.11*</td>
</tr>
<tr>
<td></td>
<td>.69***</td>
<td>.20***</td>
<td>.42***</td>
<td>.23***</td>
<td>.35***</td>
<td>.17***</td>
</tr>
<tr>
<td>age 2 (P)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU beh</td>
<td>.23***</td>
<td>.12**</td>
<td>.55***</td>
<td>.21***</td>
<td>.44***</td>
<td>.25***</td>
</tr>
<tr>
<td></td>
<td>.49***</td>
<td>.19***</td>
<td>.77***</td>
<td>.44***</td>
<td>.55***</td>
<td>.35***</td>
</tr>
<tr>
<td>age 3 (P)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU beh</td>
<td>.20***</td>
<td>.12**</td>
<td>.40***</td>
<td>.07ns</td>
<td>.57***</td>
<td>.25***</td>
</tr>
<tr>
<td></td>
<td>.40***</td>
<td>.22***</td>
<td>.51***</td>
<td>.27***</td>
<td>.78***</td>
<td>.32***</td>
</tr>
<tr>
<td>age 4 (P)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001. Note. P = parent report; A = alternative caregiver report; Eyb = EBCI Problem Factor to assess conduct problems; Ext = CBCL Externalizing Factor; CU beh = CU behavior.

Fourth, Table 12 presents regression models of CU behavior predicting either age 3 or age 4 problem behavior, while controlling for earlier problem behavior. Specifically,
models tested whether CU behavior at age 2 predicted conduct problems and externalizing behavior (Eyberg and CBCL, parent report and alternative caregiver report) at age 3 or age 4, controlling for problem behavior at age 2. Models also tested whether CU behavior at age 3 predicted conduct problems and externalizing behavior (Eyberg and CBCL; parent report and alternative caregiver report) at age 4, controlling for problem behavior at age 3. CU behavior was always related to later conduct problems, controlling for earlier conduct problems when parent report was used for both measures. Results across informant (parents reported on CU behavior and alternative caregivers reported on problem behavior) were less robust for age 2 CU behavior, but age 3 CU behavior was generally associated with later problem behavior across informants.

Table 12: Longitudinal prediction of conduct problems (Eyberg) and externalizing behavior (CBCL) by CU behavior (within and across informant)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Predictors</th>
<th>Eyberg age 3 (P)</th>
<th>Eyberg age 3 (A)</th>
<th>Eyberg age 4 (P)</th>
<th>Eyberg age 4 (A)</th>
</tr>
</thead>
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<tr>
<td></td>
<td>B(SE)</td>
<td>B</td>
<td>B(SE)</td>
<td>B</td>
<td>B(SE)</td>
</tr>
<tr>
<td>Eyberg age 2 (P/A)</td>
<td>.45(.04)</td>
<td>.37***</td>
<td>.51(.06)</td>
<td>.45***</td>
<td>.40(.05)</td>
</tr>
<tr>
<td>CU behavior age 2 (P)</td>
<td>.65(.15)</td>
<td>.17***</td>
<td>.27(.18)</td>
<td>.07ns</td>
<td>.73(.17)</td>
</tr>
<tr>
<td>Eyberg age 3 (P/A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.63(.04)</td>
</tr>
<tr>
<td>CU behavior age 3 (P)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.48(.16)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Predictors</th>
<th>CBCL age 3 (P)</th>
<th>CBCL age 3 (A)</th>
<th>CBCL age 4 (P)</th>
<th>CBCL age 4 (A)</th>
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<tbody>
<tr>
<td></td>
<td>B(SE)</td>
<td>B</td>
<td>B(SE)</td>
<td>B</td>
<td>B(SE)</td>
</tr>
<tr>
<td>Eyberg age 2 (P/A)</td>
<td>.42(.05)</td>
<td>.41***</td>
<td>.66(.05)</td>
<td>.60***</td>
<td>.37(.06)</td>
</tr>
<tr>
<td>CU behavior age 2 (P)</td>
<td>.62(.18)</td>
<td>.16**</td>
<td>.03(.17)</td>
<td>.01ns</td>
<td>.37(.19)</td>
</tr>
<tr>
<td>Eyberg age 3 (P/A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.33(.06)</td>
</tr>
<tr>
<td>CU behavior age 3 (P)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.79(.21)</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001. Note. P = parent report; A = alternative caregiver report
Finally, Figure 5 presents the contribution of age 3 CU behavior to the prediction of the slope of conduct problems (Eyberg) between ages 2-5. The model fit was acceptable, $\chi^2(28, N = 731) = 131.25, p < .001$; CFI=.93; TLI=.91; RMSEA=.07; SRMR=.06, and the latent factor of CU behavior estimated in the model predicted the slope of conduct problems ($\beta = .44, p < .001$), controlling for relevant covariates (not shown in model; intervention status, child gender and race, parent education and family income). Across the different analyses, the CU behavior measure therefore shows reliability and validity. In addition, the findings are in agreement with previous studies showing that CU behaviors identify a subgroup of youth with earlier-starting, more severe behavior problems, and worse long-term outcomes (e.g., Christian et al., 1997; Dadds, Whiting, & Hawes, 2006b; Fontaine et al., 2011; Frick et al., 2003b). At the same time, the findings are in support of the premise outlined in Chapter 2 – that it is important, and possible, to separate measurement of early affective deficits from measurement of general conduct problems.

**Figure 5: Latent growth model showing prediction of conduct problems slope (ages 2-5 years old) by CU behavior at age 3**

\[ p < .05, \quad **p < .01, \quad ***p < .001 \]
4.4.2. Observed positive parenting

Background and rationale for deriving new measure

Chapter 3 outlined various approaches that previous studies have adopted to test associations between parenting and CU traits. Within this context, two key limitations undermined the validity of the measures adopted by many previous studies. The current thesis seeks to address some of these limitations. First, many previous studies that have tested associations between parenting and CU traits are limited by use of parent self-report data. There are a range of general methodological concerns about these techniques (Gardner, 2000; Morsbach & Prinz, 2006). These concerns center on well-known threats to validity associated with self-report methods, including social desirability effects. In addition, there are specific difficulties relating to assessing parenting via use of parental self-report data (Holden, 2001; Krevans & Gibbs, 1996). These include requiring parents to interpret the meaning of items relating to parenting constructs (e.g., time-out or proactiveness) or being asked to make judgments about high-frequency behaviors over significant time periods (e.g., positive verbal engagement versus yelling over a month, or even a year) (see Morsbach & Prinz, 2006). Further, when parents report on child outcomes as well as parenting, there is a further (though related) limitation that arises, namely that it is not clear the extent to which shared method variance is responsible for inflating reported associations. This limitation may be particular salient in relation to the measurement of parenting and child CU traits (see Chapter 3).

A second limitation relates to the use of observational measures of parenting. On the one hand, Chapter 3 identified five previous studies that have employed direct observation of parenting, which is considered a potentially stronger alternative, or
complement, to parent reports of parenting, taking advantage of assessing naturally occurring parenting behavior, using relatively unbiased observers. However, direct observational methods are not immune from threats to validity, including observer reactivity, or inadequate sampling of behavior, in terms of length or setting of observations (Aspland & Gardner, 2003; Gardner, 2000; Stoolmiller, Eddy, Reid, 1999).

The current thesis focused on developing a multi-method observational measure of positive behavior support, and therefore sought to address many of the limitations outlined above, including social desirability, observer reactivity, and inadequate sampling of behavior. Specifically, this thesis combines ratings from three different approaches to observing parent behavior (see Section 4.2.6), including both micro-social analysis and macro-social global ratings of videotaped parent-child interactions during structured tasks in the home. In addition, an independent assessor rated global, non-structured parent-child interactions following a ‘live’ home visit of 2-3 hours duration. These ratings were combined to form a latent construct of positive behavior support thereby providing an index of parental behavior that was holistic, multi-context, combining global and event data from three methods and two independent observers, and drawing across structured and non-structured tasks.

A composite variable for observed positive behavior support at ages 2–5 years old was created for ongoing analyses within the Early Steps study using items from three different observational assessment strategies (Waller et al., manuscript in preparation). However, this thesis only uses the observed positive behavior support variable at ages 2 and 3 years old. The term ‘positive behavior support’ emerged from the educational literature to define a set of practices that integrate various parenting practices (Dishion et al., 2008). Broadly conceived, the term positive behavior support includes several key parenting
practices, including effectively prompting positive child behavior, proactively establishing
activities that encourage children’s positive behavior, providing appropriate choices,
warmth and sensitivity to children’s emotional experience, and contingent rewards for
positive behavior (Crone, Horner, & Hawken, 2003; Dunlap & Fox, 2009).

Methods for developing measure

First, home visitors completed the Infant/Toddler Home Observation for Measurement of
the Environment (IT-HOME; Caldwell & Bradley, 1984). The original IT-HOME included
45 items measured by examiner observation and interview. The Early Steps study
administered the Responsivity, Acceptance, and Involvement scales. Assessment was based
entirely on examiner observation, eliminating original items that require caregiver
interviews, yielding a subset of 21 items. In addition, various examiner impressions,
developed for the Early Steps study, were added to the original 21 IT-HOME items,
resulting in 38 items. These additional impressions included ratings of the home
environment, parent social skills and affect, and the family’s neighborhood.

Parent support for children’s positive behavior in the home observation session was
therefore broadly defined as prompting positive behavior through warmth and positive
affect, as well as responding positively to children’s behavior after it occurs. From the 38
items of the HOME, 13 items were identified as being theoretically related to the construct
of positive parental behavior support. Items were chosen if they reflected either, (a)
proactive parenting/effective management of child’s behavior or structuring of the child’s
environment (6 items, including ‘parent structures child’s play’ and ‘parent seemed in good
control of the child’), or, (b) parental warmth, positive parental reinforcement of behavior
through praise or displays of affection (7 items, including ‘parent caresses or kisses child at
least once’ and ‘parent’s voice conveys positive feelings towards child’). The 13 items were summed to create a directly observed positive behavior support subscale from home visitor ratings, which demonstrated good reliability (e.g., age 2, $\alpha=.73$; age 3, $\alpha=.76$).

Second, a team of undergraduates, blind to families’ intervention status, coded videotaped family interaction tasks (see study procedures) using the Relationship Affect Coding System (RACS; Peterson, Winter, Jabson, & Dishion, 2008), a micro-social coding system that captures the topography of relationships behaviors, as well as the affect within parent-child interactions (i.e., emotional displays, or lack thereof). The RACS coding system reflects two dimensions of behavior for all family participants simultaneously. The first of these two dimensions assess the behavior topography, which is captured as either verbal or physical behaviors, and are a priori classified as interpersonally positive, neutral or negative. Verbal codes reflect two different types of events: general conversation (positive, negative, or neutral) and attempts at changing the behavior of another (directives, negative directive, and positive structure). Physical behaviors are those that involve a physical interaction (positive physical contact, negative physical contact and neutral physical contact). The second dimension is the emotional affect of the behavior. At any given moment during an interaction, the parent and child can have one code (or event or state) recorded from each of these three data streams. Affect codes reflect the general affect displayed by parent and child in an interaction (anger/disgust, validation, distress, positive affect and, ignore). The cues used for code selection are based on facial expression, vocal tone, and nonverbal cues, such as body posture and/or orientation.

The two dimensions of the behavior coding were aggregated to define three behavioral states: Positive Engagement, Neutral Engagement (e.g., conversation), Coercive Engagement, and Non-interactive. Given that all family members are coded at the same
time, the behavior streams were organized as dyadic events. The duration of dyadic states reflects both the parent and child’s interactive state. A summary score was created for observed positive behavior support that reflected the duration of Positive and Neutral Engagement between the caregiver and the child. Parents are deemed high on positive behavior support when they successfully engage young children in continuous conversation and both prompt and reinforce children’s interaction for longer durations. Inter-rater reliability for RACS was calculated using Noldus Observed Pro 5.0 software based on the duration of each micro-social behavior. To reach acceptable reliability, coders had to achieve 70% agreement and $kappa=0.70$ on two consecutive training assignments, which had been coded by a ‘master coder’. Fifteen percent of videotapes were coded twice, with acceptable agreement (average team percent agreement=0.87; $kappa=0.86$). A variable was derived from the RACS code to reflect the positive behavior support construct. This RACS variable was derived from the duration proportion of positive parent-child engagement, comprising parent-child interactions that were coded as positive or neutral displays of verbal, physical and affective behavior.

Third, following the micro-social coding, coders completed a macro-social rating scale on the same videotaped interactions using the Coder Impressions Inventory (Dishion, Hogansen, Winter, & Jabson, 2004). As with the development of the HOME positive behavior support subscale, 11 macro-social items were drawn from the Coder Impressions Inventory that reflected either, (a) proactive parenting/effective management of child’s behavior/structuring of the child’s environment (7 items, including ‘parent defines the situation so as to assure the child’s interest, success and comfort’ and ‘parent is appropriately contingent in responding to positive or compliant child behavior’), or, (b) parental warmth, positive parental reinforcement of behavior through praise or displays of
affection (4 items, including ‘parent hugs, kisses, cuddles and tickles the child’ and ‘parent shows affection for the child’). The 11 items were summed to form a composite COIMP positive behavior support subscale, showing good reliability (age 2, $\alpha=.85$; age 3, $\alpha=.84$).

Table 13: Cross-sectional and longitudinal bivariate correlations between cross-method, cross-informant positive behavior support subscales at ages 2 and 3

<table>
<thead>
<tr>
<th>RACS subscale</th>
<th>COIMP subscale</th>
<th>HOME subscale</th>
<th>RACS subscale</th>
<th>COIMP subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HOME subscale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age 2</td>
<td>.30**</td>
<td>.34***</td>
<td>.49***</td>
<td>.20**</td>
</tr>
<tr>
<td>age 2</td>
<td>.28***</td>
<td>.30***</td>
<td>.44***</td>
<td>.18***</td>
</tr>
<tr>
<td>age 2</td>
<td>.31***</td>
<td>.28**</td>
<td>.30***</td>
<td></td>
</tr>
<tr>
<td>age 3</td>
<td></td>
<td></td>
<td></td>
<td>.29***</td>
</tr>
<tr>
<td>age 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001

Results of deriving new measure

To develop a multi-method, multi-informant composite variable of positive behavior support, the subscales from all three measures were used. Table 13 shows the inter-subscale (cross-method) correlations at ages 2 and 3, which suggest that these very different methods are assessing similar aspects of parenting behavior and the parent-child relationship. Confirmatory factor analysis in MPlus 6.0 (Muthen & Muthen, 2010) indicated that the three subscales from across the different measures formed a latent factor at ages 2 and 3 (Figure 6) and the measurement model was a good fit to the data, $\chi^2(5, N = 731) = 23.56, p < .01; CFI=.98; TLI=.94; RMSEA=.07; SRMR=.02$. Consequently, scores were standardized at ages 2 and 3, and summed to form a composite of observed positive parenting (age 2, $\alpha=.57$; age 3, $\alpha=.63$). Analyses using this observed positive parenting variable were run using, (a) both the latent factor combining subscales in a structural
equation modeling framework and, (b) using the composite score (sum of standardized subscales).

Validation of the measure is ongoing (Waller et al., manuscript in preparation), but preliminary analyses indicate that it has both construct and predictive validity. For example, even controlling for age 2 covariates and parent-reported versions of outcome measures in models, observed positive behavior support predicts teacher reports of aggressive oppositional behavior ($\beta = -0.21, p < .01$), effortful control ($\beta = 0.23, p < .01$), IQ ($\beta = -0.21, p < .01$), relationship conflict ($\beta = -0.18, p < .01$) and positive social interactions and peer relations ($\beta = 0.21, p < .01$) at age 7.5 years old.

Figure 6: Measurement model of multi-method, multi-informant observed measure of parental positive behavior support at ages 2 and 3 (from Waller et al., manuscript in preparation)

\* $p < .05$, \** $p < .01$, \ *** $p < .001$. 

![Diagram](image.png)
4.4.3. Expressed parental warmth and criticism (Family Affective Attitudes Rating Scale)

Background and rationale for deriving new measure

One approach to examine parenting behavior more precisely in this thesis has involved development of a multi-method observation composite of observed positive behavior support (see Section 4.4.2). However, it has also been argued that parenting needs to be contextualized within the complex interplay of responses, behaviors, and prior interactions shared by parent and child (Belsky, 1984). There is therefore a need for measures that can assess both dimensions of parenting, and broader characteristics of the parent. One method to assess affective, cognitive, and relational dimensions of parenting originated with investigations of expressed emotion. Expressed emotion refers to a parent’s emotional attitudes towards their child and was originally measured using the semi-structured Camberwell Family Interview (Vaughn & Leff, 1976), which obtains information from a family member about a target individual and broader family relationships, and is coded on two dimensions of criticism and emotional over-involvement. Magana et al. (1986) extended the use of the expressed emotion construct to understanding the development of child psychopathology. They developed a coding system for parental five-minute speech samples using the original Camberwell Family Interview dimensions, but reduced the cost and time involved. During the five-minutes, a parent is asked to talk about the relationship with their child. Expressed emotion is coded according to the content and tone of the statements.
However, two key limitations are associated with the use of the Magana coding system with child populations, which seem related to the original downward extension of the adult dimensions of expressed emotion. First, aspects of the emotional over-involvement dimension of expressed emotion, potentially dysfunctional when presenting in parents of adult or adolescent children, may be developmentally appropriate for parents of younger children, who are more dependent on their parents for emotional support (Wamboldt, O’Connor, Wamboldt, Gavin, & Klinnert, 2000). In support of this premise, parental emotional over-involvement items demonstrated a lack of cohesion and internal consistency in a young sample (Peris & Baker, 2000) and failed to predict child externalizing and internalizing behavior in a consistent way (McCarty & Weisz, 2002). Second, there was no dimension for positive expressed emotion or warmth. Indeed, some positive comments appear as emotional over-involvement items, meaning they represent dysfunctional expressed emotion. However, a higher number of positive remarks coded as emotional over-involvement were found to predict fewer child externalizing problems (McCarty & Weisz, 2002). Further, given the socioemotional profile of children with emerging CU traits and conduct problems, aspects of parental positive affect and warmth seem particularly important targets of investigation.

The Family Affective Attitude Rating Scale (FAARS; Bullock, Schneiger, & Dishion, 2005) was developed to code parental affective attitudes expressed during a five minute speech sample, and address the limitations of previous coding systems. Parental affective attitudes, related to the construct of expressed emotions, are the internal representations a parent holds about their child and their relationship. Affective attitudes derive from previous experiences of and beliefs about parenting and child behavior, contributing to the development of over-learned patterns of behavior and networks of
linked ideas (Bullock & Dishion, 2007). These internal representations are expressed verbally by a parent during a five minute speech sample.

FAARS coding for a parental five minute speech sample therefore holds clinical and research promise for a number of reasons. First, the FAARS scales directly assess parental perceptions of their child, their parenting experiences and the history of their parent-child interactions. Second, the FAARS scales may indirectly provide an indication of broader affective characteristics of the parent, including their level of stress and psychopathology. Finally, FAARS includes dimensions for both the negative/critical and positive emotional attitudes of parents, which may be particularly salient to investigation of the development of child CU traits. Fourth, FAARS coding was developed to be briefer and more cost-effective than the EE-FMSS coding system (Bullock et al., 2005; Bullock & Dishion, 2007). This means that FAARS may be particularly useful in the context of large trials and longitudinal studies, where there is a need for reliable and brief measures that provide an overview of parent-child interactions, parental dysfunction, and parent behavior.

FAARS coding has been validated in two previous studies to date. In the first study, its developers assessed youths aged 9-17 years ($N = 40$), grouped according to high or low parent-reported levels of antisocial behavior (Bullock & Dishion, 2007). Second, Pasalich, Dadds, Hawes, & Brennan (2011a) examined FAARS in parents of children (aged 4-11) with behavior problems ($N = 150$). However, while there is psychometric support for its use, the measurement properties of FAARS have not yet been examined in very young children. It has been argued that a key developmental phase exists in the early toddler years, when parent-child interactions become particularly important as a child’s language, mobility, independence, and potential non-compliance start to increase (Shaw & Bell, 1993). At this time, children become more active in parent-child interactions, and with
this, parents’ internal representations and affective attitudes about their child may begin to be shaped in new ways. Simultaneously, a child’s behavior may be influenced by developing parental affective attitudes and associated parenting behaviors. As such, there is a need for the validation of FAARS at very young ages.

This thesis therefore extends previous validation efforts by assessing inter-rater agreement, inter-item consistencies, and scale reliabilities of the FAARS scales in parents of children aged 2 and 3 years old. This thesis also represents the first time that the psychometric properties of FAARS have been examined both cross-sectionally and longitudinally. First, this thesis tests the relation between the FAARS scales at ages 2 and 3 with observed parenting and parent-reports of relationship conflict with their child. In line with the findings of the previous validation studies (e.g., Bullock & Dishion, 2007), it was predicted that there would be convergence between FAARS scales and these alternative measures of parenting. Second, the convergence of parental affective attitudes with parental depressive symptomatology and parent-reported frequency of daily hassles was assessed. Previous studies have demonstrated moderate associations between high levels of critical expressed emotion with maternal stress (Baker, Heller, & Henker, 2000), conflict among family members (Schnur, Friedman, Dorman, Redford, & Martin, 1986), and maternal depression (Schwartz, Dorer, Beardslee, Lavori, & Keller, 1990). In addition, Pasalich et al. (2011a) found that parents’ FAARS scores were related to measures of family dysfunction and parental psychopathology. It was therefore predicted that as well as showing convergence with parenting behavior, the FAARS scales would also be related to the measures of parental dysfunction. Finally, this thesis tested the relation between the FAARS scales with concurrent and later problem child behavior.
Methods for developing measure

Two waves of five minute speech samples were collected at the end of home assessments when children were aged 2 and 3 (see Section 4.2.6). The parent and interviewer were alone in one room in the home to record the five minute speech sample, with distractions kept to a minimum. Interviewers gave the following instructions to parents: ‘I’d like to hear your thoughts and feelings about (child’s name), in your own words and without my interrupting with any questions or comments. When I ask you to begin I’d like you to speak for 5 min, telling me what kind of a person (child’s name) is and how the two of you get along together. After you begin to speak, I prefer not to answer any questions until after the 5 minutes. Do you have any questions?’ During the five minutes the speech sample was recorded, interviewers worked quietly on a task and avoided prompting.

Five minute speech samples were coded by bachelors and masters-degree level students, who were trained using a written manual (Bullock et al., 2005). Coding teams met once or twice a week during training, and it took an average of four weeks to train a team fully. Coders were required to achieve 80% agreement on seven consecutive training samples after which, coders continued to meet weekly to prevent coder drift. Coders provided ratings of the speech sample across several dimensions based on both global impressions and the tone of the speech sample, as well as substantive information provided by parents about attributions or behaviors. Twenty-five items were coded and grouped into three scales: negative affective attitudes, positive affective attitudes, and family cohesion. For this thesis, only the negative and positive scales were used (Table 14). Each of the five negative items (e.g., ‘parent is critical of the child’s behavior) and five positive items (e.g., ‘parent reports a positive relationship with the child’) were rated on a 9-point Likert scale. Coding was based on global impressions of the speech sample and a guideline for scoring is
provided in the FAARS coding manual: 1 (no examples), 2–3 (some indication, but no concrete evidence), 3–4 (one or more weak examples), 5 (one concrete, unambiguous but unqualified example, or three or more weak examples of the same behavior), 6–8 (at least one concrete example and one or more weak examples of different behaviors/attributes), and 9 (two or more concrete, unambiguous examples) (see Bullock et al., 2005). Qualifying statements were coded as neutral (i.e., a negative or positive statement followed by a qualifier, such as, ‘but’). The rating of an item between coders was considered an agreement if the scores were within 2 points (e.g., scores of 5 and 7 are an agreement, but scores of 5 and 8 are a disagreement). The total number of agreements over both scales were summed and divided by the total number of items to determine the percent agreement (82.8 % agreement at age 2; 80.7 % agreement at age 3).

To examine the validity of the measure, three stages of analyses were conducted. First, the reliability of scales was examined by assessing item descriptive statistics, inter-item correlations, inter-scale correlations, the Cronbach’s alpha of scales, and stability of scales from ages 2 and 3. Second, the construct validity of the measure was assessed. The convergence of parental affective attitudes with general measures of parental dysfunction and alternative measures of parenting was tested through correlational and regression analyses. Finally, the predictive validity of FAARS scales was tested using regression analysis. Specifically, the ability of FAARS scores to predict later child conduct problems, over and above alternative measures of parenting was tested. In regression models, parent education, parent income, child gender and child race were controlled for, to demonstrate that they were not related to FAARS scores. In the current sample, which is multi-ethnic and high risk, this was an important step to show that affective attitudes are not a proxy for demographic variables (Boger, Tompson, Briggs-Gowan, Pavlis, & Carter, 2008).
Results of deriving new measure

First, individual-item means, individual-item standard deviations and scale means, and
standard deviations for the negative and positive scales at ages 2 and 3 were examined
(Table 14). Cronbach’s alphas indicated good internal reliability for all scales (age 2
negative, $\alpha$=.80; age 2 positive, $\alpha$=.69; age 3 negative, $\alpha$=.81; age 3 positive, $\alpha$=.67). These
results are broadly similar to those found in two previous FAARS validation studies
(Bullock & Dishion; 2007; Pasalich et al., 2011a), conducted with older age groups. For the
negative scale, inter-item correlations were moderate to strong at ages 2 (range =.38-.60, $p$
< .01) and 3 (range =.43-.68, $p$ < .01). The positive scale included weaker associations with
the ‘statements of love and caring’ item (across ages 2 and 3, range =.04ns -.34, $p$ < .01),
but otherwise the inter-item correlations were moderate at 2 (range=.30-.51, $p$ < .01) and 3
(range=.33-.44, $p$ < .01).
The correlations between individual items and mean scores of scales were moderate-to-strong (Table 14). Finally, the correlations between the negative and positive scales at both ages were computed (Table 15). There were moderate correlations between the scales at ages 2 and 3 indicating stability in the measure. There were weaker correlations between the negative and positive scales cross-sectionally, suggesting that the two FAARS scales represent separate constructs. Bivariate correlations between FAARS scales and other study variable were also computed (Table 15). There were weak-moderate correlations between FAARS scores and measures of parental dysfunction, observed and parent-reports of parenting behavior, and child behavior problems.
Second, in a test of construct validity, separate regression analyses were conducted to test prediction of negative and positive affective attitudes by two measures of dysfunction, parental depressive symptoms and parent reports of daily hassles (Table 16). In each model, intervention status, child race and gender, and parent education and income were entered in step 1 to ensure that any relationship between parental dysfunction and affective attitudes was over and above relevant covariates. Cross-sectional models were tested first. The model predicting age 2 negative affective attitudes was significant, $F(6,721) = 3.21, p < .001$, and age 2 daily hassles accounted for unique variance in score. At age 3, the models for both negative, $F(6,721) = 17.44, p < .001$, and positive, $F(6,721) = 3.30, p < .01$, affective attitudes were significant. Predicting to age 3 negative affective

<table>
<thead>
<tr>
<th></th>
<th>Age 2 negative</th>
<th>Age 2 positive</th>
<th>Age 3 negative</th>
<th>Age 3 positive</th>
</tr>
</thead>
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<td>Age 2 positive FAARS</td>
<td>-.12**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 3 negative FAARS</td>
<td>.40**</td>
<td>-.14**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 3 positive FAARS</td>
<td>-.15**</td>
<td>.36**</td>
<td>-.27**</td>
<td></td>
</tr>
<tr>
<td>Age 2 depressive symptoms</td>
<td>.03</td>
<td>.04</td>
<td>.15**</td>
<td>-.06</td>
</tr>
<tr>
<td>Age 3 depressive symptoms</td>
<td>.10**</td>
<td>.02</td>
<td>.26**</td>
<td>-.08</td>
</tr>
<tr>
<td>Age 2 daily hassles frequency</td>
<td>.13**</td>
<td>.01</td>
<td>.19**</td>
<td>-.01</td>
</tr>
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<td>-.05</td>
<td>.31**</td>
<td>-.14**</td>
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<td>-.10**</td>
<td>.22**</td>
<td>-.14**</td>
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<td>.45**</td>
<td>-.25**</td>
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<td>-.11**</td>
<td>.10**</td>
</tr>
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<td>.15**</td>
<td>-.11**</td>
<td>.16**</td>
</tr>
<tr>
<td>Age 2 observed harsh parenting</td>
<td>.11**</td>
<td>-.14**</td>
<td>.10*</td>
<td>-.08*</td>
</tr>
<tr>
<td>Age 3 observed harsh parenting</td>
<td>.02</td>
<td>-.13**</td>
<td>.11**</td>
<td>-.09*</td>
</tr>
<tr>
<td>Age 2 child problem behavior</td>
<td>.32**</td>
<td>-.18**</td>
<td>.27**</td>
<td>-.13**</td>
</tr>
<tr>
<td>Age 3 child problem behavior</td>
<td>.23**</td>
<td>-.15**</td>
<td>.45**</td>
<td>-.26**</td>
</tr>
<tr>
<td>Age 4 child problem behavior</td>
<td>.13**</td>
<td>-.10**</td>
<td>.34**</td>
<td>-.18**</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001
attitudes, both age 3 depressive symptoms and daily hassles accounted for unique variance. Predicting to age 3 positive affective attitudes, only daily hassles explained unique variance. For longitudinal models, only the model for negative affective attitudes at age 3 was significant, \( F(6,721) = 6.22, p < .001 \); both depressive symptoms and daily hassles at age 2 accounted for unique variance. The results therefore support moderate convergence between FAARS scales and parental dysfunction.

Table 16: Cross-sectional and longitudinal associations between measures of parental dysfunction and FAARS scales at ages 2 and 3

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Age 2 negative</th>
<th>Age 3 negative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (SE) ( \beta )</td>
<td>B (SE) ( \beta )</td>
</tr>
<tr>
<td>Age 2 depressive symptoms</td>
<td>-.001 (.01) (-.01)</td>
<td>.13 (.01) (.10^{**})</td>
</tr>
<tr>
<td>Age 2 daily hassles</td>
<td>.021 (.01) (.14^{***})</td>
<td>.02 (.01) (.16^{***})</td>
</tr>
<tr>
<td>( \Delta R^2 = .03^{***} )</td>
<td>( \Delta R^2 = .05^{***} )</td>
<td></td>
</tr>
<tr>
<td>Age 3 depressive symptoms</td>
<td>.02 (.01) (.18^{***})</td>
<td></td>
</tr>
<tr>
<td>Age 3 daily hassles</td>
<td>.04 (.01) (.25^{***})</td>
<td></td>
</tr>
<tr>
<td>( \Delta R^2 = .13^{***} )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Age 2 positive</th>
<th>Age 3 positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (SE) ( \beta )</td>
<td>B (SE) ( \beta )</td>
</tr>
<tr>
<td>Age 2 depressive symptoms</td>
<td>.01 (.01) (.037)</td>
<td>-.01 (.01) (-.04)</td>
</tr>
<tr>
<td>Age 2 daily hassles</td>
<td>-.001 (.001) (-.01)</td>
<td>.001 (.01) (.01)</td>
</tr>
<tr>
<td>( \Delta R^2 = .01^{ns} )</td>
<td>( \Delta R^2 = .01^{ns} )</td>
<td></td>
</tr>
<tr>
<td>Age 3 depressive symptoms</td>
<td>-.003 (.01) (-.03)</td>
<td></td>
</tr>
<tr>
<td>Age 3 daily hassles</td>
<td>-.02 (.01) (-.13^{***})</td>
<td></td>
</tr>
<tr>
<td>( \Delta R^2 = .03^{**} )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( p < .05,^{**} p < .01,^{***} p < .001 \). Note: Intervention group, parent and income, and child race and gender were included, but did not contribute significantly to models and are therefore not shown in the table.

Third, in a further test of construct validity, the association between alternative measures of parenting and the FAARS scales was examined in regression models (Table 17). At age 2, regression models predicting negative, \( F(7,721) = 6.74, p < .001 \), and
positive, $F(7,721) = 5.29, p < .001$, scales were significant. For age 2 negative affective attitudes, age 2 parent-reported relationship conflict accounted for unique variance in score. When age 2 positive affective attitudes was included as the outcome in the model, age 2 positive parenting and observed harsh parenting also accounted for unique variance in score. Both cross-sectional models at age 3 were also significant (negative, $F(7,721) = 27.01, p < .001$; positive, $F(7,721) = 10.85, p < .001$). For age 3 negative affective attitudes, age 3 parent-reported relationship conflict accounted for unique variance in score. Finally, for age 3 positive affective attitudes, both age 3 observed positive parenting and parent-reported relationship conflict accounted for unique variance in score. Longitudinal regression models were tested by assessing the prediction of age 3 affective attitudes by the alternative measures of parenting at age 2. As predicted, the model for age 3 negative parental affective attitudes was significant, $F(7,721) = 6.80, p < 0.001$, and both age 2 parent-reported relationship conflict and age 2 observed positive parenting accounted for unique variance in score. The model for age 3 positive affective attitudes was also significant, $F(7,721) = 3.99, p < 0.001$, and both age 2 observed positive parenting and age 2 parent-reported relationship conflict accounted for unique variance in score (Table 17).
Finally, in a test of predictive validity, the relation between FAARS and child problem behavior was assessed. Specifically, regression models were run to examine whether FAARS uniquely added to the prediction of child conduct problems, over and above alternative measures of parenting (Table 18). In each model, intervention status, child race and gender, and parent education and income were entered in step 1. In step 2, parent-reported and observed measures of harsh and positive parenting were entered. Finally, in step 3, negative and positive FAARS scores were entered. The model predicting age 3 conduct problems from age 2 measures was significant, $F(10,721) = 21.01, p < .001$, and age 2 negative and positive affective attitudes both explained unique variance. The model was also significant predicting to age 4 conduct problems from age 3 measures, $F(10,721) = 38.48, p < .001$, but only negative affective attitudes accounted for unique

Table 17: Cross-sectional and longitudinal associations between parent-reported and observed parenting measures with FAARS scales at ages 2 and 3

<table>
<thead>
<tr>
<th>Outcome of regression models (FAARS scales)</th>
<th>Age 2</th>
<th>Age 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 2 predictors</td>
<td>Negative</td>
<td>Positive</td>
</tr>
<tr>
<td>Parent-reported conflict</td>
<td>B (SE)</td>
<td>β</td>
</tr>
<tr>
<td>Observed positive parenting</td>
<td>-.04 (.01)</td>
<td>-.01 (.01)</td>
</tr>
<tr>
<td>Observed harsh parenting</td>
<td>.01 (.01)</td>
<td>.06 (.01)</td>
</tr>
</tbody>
</table>

| Age 3 predictors                            | Negative | Positive | Negative | Positive |
|---------------------------------------------| B (SE) | β     | B (SE) | β     | B (SE) | β     | B (SE) | β     |
| Parent-reported conflict                    | .07 (.01) | .44 (.01) | -.04 (.01) | -.24 (.01) |
| Observed positive parenting                 | -.12 (.07) | -.06 (.07) | .33 (.08) | .17 (.08) |
| Observed harsh parenting                    | .004 (.01) | .02 (.01) | -.001 (.01) | .003 (.01) |

$ΔR^2 = .06 ***$  $ΔR^2 = .05 ***$  $ΔR^2 = .06 ***$  $ΔR^2 = .04 ***$

$p < .05$,  $** p < .01$,  $*** p < .001$. Note: Demographic factors included in models but not shown in table
variance in child outcome. However, when age 2 conduct problems were included in models to test for autoregressive effects, the contribution of FAARS was no longer significant.

Table 18: Longitudinal prediction of child problem behavior by FAARS scales (over and above observed and parent-reported measures of parenting, and demographic factors)

<table>
<thead>
<tr>
<th>Predictors (controlling for demographic factors)</th>
<th>Age 3 child problem behavior</th>
<th>Age 4 child problem behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (SE)</td>
<td>( \beta )</td>
</tr>
<tr>
<td>Age 2 parent-reported relationship conflict</td>
<td>.39 (.04)</td>
<td>.36***</td>
</tr>
<tr>
<td>Age 2 observed positive behavior support</td>
<td>-.43 (.36)</td>
<td>-.04</td>
</tr>
<tr>
<td>Age 2 observed harsh parenting</td>
<td>.14 (.06)</td>
<td>.08*</td>
</tr>
<tr>
<td>Age 2 negative FAARS</td>
<td>.77 (.21)</td>
<td>.13***</td>
</tr>
<tr>
<td>Age 2 positive FAARS</td>
<td>-.45 (.18)</td>
<td>-.08*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Age 3 parent-reported relationship conflict      | .53 (.04) | .49*** |
| Age 3 observed positive behavior support         | -.36 (.39) | -.03 |
| Age 3 observed harsh parenting                   | .20 (.06) | .11*** |
| Age 3 negative FAARS                             | .60 (.22) | .09** |
| Age 3 positive FAARS                             | -.12 (.19) | -.02 |
|                                                 |        |      | R\(^2\) = .35*** |

\( p < .05, \quad ^* p < .01, \quad ^** p < .001 \). Note: Demographic factors included in models but not shown in table

The FAARS scales therefore appeared to show reliable coding and reasonable construct validity. Both FAARS scales showed convergence across various alternative measures of parenting and parental dysfunction demonstrating the construct validity of the measure as an index of the affective beliefs and ideas a parent holds about their child and the parent-child relationship. First, FAARS scores were moderately related to the frequency of daily hassles and depressive symptoms reported by parents, both cross-sectionally and longitudinally. This finding fits with other studies that have found an association between parental expressed emotion with maternal stress, family conflict and dysfunction, and
parental psychopathology (e.g., Baker et al., 2000; Pasalich et al., 2011a). Specifically, representations a parent has about their child and parent-child relationship appear inseparable from proximal stressors that define the context the relationship, including fluctuating, environment-driven factors, such as day-to-day hassles, and more stable, trait-based characteristics, such as depression. Second, consistent with two previous validation studies (Bullock & Dishion, 2007; Pasalich et al., 2011a), FAARS scores converged with alternative measures of parenting. Relationship conflict was a consistent predictor of negative and positive affective attitudes, although method overlap could be responsible for inflating the magnitude of the associations, as both a FMSS and relationship-conflict score involve parent reports of interactions with their child. However, FAARS scales also converged with observed positive parenting. Specifically, observed displays of a parental support of, interactive involvement with, and positive reaction to child behavior predicted FAARS scores. The results suggest that positive parenting experiences are reflected in the feelings expressed by a parent, although the variance explained by observed positive parenting was modest. Finally, the negative FAARS scale contributed a modest amount of variance to the prediction of subsequent child conduct problems, after accounting for the effects of alternative measures of parenting.

4.4.4. Directly observed parental warmth

Background and rationale for deriving new measure

The current thesis sought to build on the measurement of parental positive behavior support described in Section 4.4.2, and develop a measure of parental warmth using direct observation parent-child interactions. Indeed, the findings of Study 1 (see Chapter 5, Section 5.2.3.) suggest that the multi-method measure of observed positive behavior
support may have been limited by weighting items related to goal-directed parenting too heavily, including a strong emphasis on parental proactiveness, scaffolding, and verbal structuring. In relation to the unique development of CU traits versus conduct problems, Study 1 suggests the need to test associations between affectively-based, rather than goal-directed, measures of positive parenting. Thus, this thesis sought to develop a more precise measure of positive parenting, which focused particularly on aspects of parental warmth.

Indeed, within Chapters 2 and 3, parental warmth emerged as being a potentially informative target of investigation in relation to the development of CU traits. The importance of a parent-child warmth dimension is not new in the literature (e.g., Schaefer, 1959; Baumrind, 1991). Warm parenting practices include high affection, positive reinforcement, sensitivity, and responsiveness to child’s emotional needs. Within the literature on CU traits, there has been an increasing focus on the affective quality of parent-child relationships in relation to the development of CU traits and child conduct problems (e.g., Hawes et al., 2011; Pardini et al., 2007; Pasalich et al., 2011b; see Chapter 3). More specifically, research has begun to examine the affective quality and emotional warmth of the parent-child relationship, because of its potential importance to understanding the development of CU traits.

In general, it has been suggested that parental warmth, child responsiveness, and successful attachment are considered to constitute a reward system. Both parent and child are theorized to experience a close and mutually warm relationship process as pleasurable, such that positive affect is positively reinforcing (see MacDonald, 1992). As such, both parent and child are motivated to be reciprocally warm towards each other and maintain a positive emotionally-driven relationship. However, lack of a secure attachment or lack of engagement of infants in reciprocally positive interactions with their caregivers, may serve
to undermine further displays of parental warmth and increase the risk that a child develops CU behaviors. Indeed, the development of a secure, reciprocally warm and mutually responsive parent-child relationship, has been shown to predict the development of key socioemotional behaviors, including empathy, prosociality, caring for others, and conscience (Kochanska, 1997; Kochanska & Murray, 2000; Kochanska et al., 2005). Thus, aspects of parental warmth may be particularly important to the development of CU behaviors, where children appear to show early deficits in empathy, emotional sensitivity, and caring.

The systematic review described in Chapter 3 identified several studies that have examined positive dimensions of parenting and their association with child CU traits. Commonly studies assessed positive aspects of parenting by combining the APQ subscales of involvement (e.g., ‘you ask your child about his/her day in school) and warmth (e.g., ‘you praise your child if he/she behaves well’). Pardini et al. (2007) and Hawes et al. (2011) used parent reports on the APQ, and Frick et al. (2003a) collected child-reported data. Yeh et al. (2011) used a child-reported 25-item questionnaire to assess general parental positive affect (e.g., ‘how often does your caregiver praise you for something you've done?’). Finally, Pasalich et al. (2011b) used the five-item positive subscale of the FAARS coding of five-minute speech sample (see Section 4.4.3; Pasalich et al., 2011a).

However, no previous studies have directly assessed parental warmth (i.e., in isolation from other aspects of positive parenting) using observational methods. Indeed, the reliance on parent- or child-reported data to assess associations between dimensions of parenting and child CU traits (i.e., when the outcome of interest relates to deficient socioemotional or affective experience) appears to be particularly problematic. As such, this thesis sought to develop a directly observed measure of parental warmth that was
drawn from examiner ratings following a 2-3 hour visit (see Section 4.2.6). The items included in the measure are global, derived from holistic observation of parent-child interactions, and incorporate broad aspects of the emotional climate of the home.

**Methods for developing measure**

The directly observed measure of parental warmth was developed from an adaptation of the Infant/Toddler Home Observation for Measurement of the Environment (IT-HOME; Caldwell & Bradley, 1984). The original IT-HOME includes 45 items measured by examiner observation and interview. The Early Steps study administered only the Responsivity, Acceptance, and Involvement scales. Furthermore, assessment was based entirely on examiner observation, eliminating items that require caregiver interviews, yielding a subset of 21 items. In addition, various examiner impressions, developed for the Early Steps project, were added to the original 21 IT-HOME items, resulting in a total of 38 items. The additional impressions included ratings of the home environment, parent social skills and affect, and the neighborhood. The warmth subscale was developed to capture global displays of parental warm behavior and warmth towards the child, providing an index of the positive emotional climate of the home. From the IT-HOME, six items were chosen to reflect positive parental affect and warmth. Items were examined in a CFA. Results confirmed that six items loaded together: ‘parent responds verbally to child’, ‘parent’s voice conveys positive feelings towards child’, ‘parent caresses/kisses child at least once during visit’, ‘parent responds positively to praise offered by visitor to child’, ‘parent is warm and friendly’, ‘parent seems to enjoy parenting’, and ‘parent seemed accepting of child’. 
Results of deriving new measure

Items were summed to create a composite index of observed parental warmth with good reliability at ages 2 (α=.73) and age 3 (α=.77). The observed measure of warmth showed moderate stability between ages 2 and 3 (r = .48, p < .001). Further, observed parental warmth converged with alternative measures assessing parental affect. First, Table 19 shows cross-sectional and longitudinal bivariate correlations (top diagonal) between alternative measures assessing parental affect and observed parental warmth at ages 2 and 3. Second, Table 19 shows cross-sectional and longitudinal partial correlations (bottom diagonal, italicized) showing associations between these same measures of parental affect and observed parental warmth at ages 2 and 3, controlling for intervention group, parent education, income, living location (urban/semi-urban versus rural), and child gender.

Table 19 indicates that the stability in the different constructs from ages 2-3 ranges from modest (e.g., r = .21, p < .001 for observed harshness) to moderate (e.g., r = .48, p < .001 for HOME observed warmth). While in general, the correlations between measures was modest, there was moderate overlap across the different methods for assessing warmth (i.e., range, r = .16-.23, p < .001) suggesting that across parent-reports, observations, and parental expressed emotion, somewhat similar dimensions of parenting were being assessed.
### Table 19: Bivariate and partial correlations (cross-sectional and longitudinal) between observed parental warmth and alternative measures assessing parental affect at ages 2 and 3

<table>
<thead>
<tr>
<th>Observed Warmth age 2</th>
<th>Parent-reported Warmth (Section 4.2.5)</th>
<th>Observed Warmth age 3</th>
<th>Parent-reported Warmth age 3</th>
<th>Observed Harshness age 2</th>
<th>Parent-reported Harshness age 3</th>
<th>Expressed from FAARS coding of parental five-minute speech sample (Section 4.4.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warmth</strong> age 2</td>
<td><strong>Warmth</strong> age 3</td>
<td><strong>Warmth</strong> age 2</td>
<td><strong>Warmth</strong> age 3</td>
<td><strong>Harsh</strong> age 2</td>
<td><strong>Harsh</strong> age 3</td>
<td><strong>Criticism</strong> age 2</td>
</tr>
<tr>
<td>Observed warmth age 2</td>
<td>.48***</td>
<td>.16**</td>
<td>.21**</td>
<td>-.33**</td>
<td>-.19**</td>
<td>-.11**</td>
</tr>
<tr>
<td>Observed warmth age 3</td>
<td>.42***</td>
<td>.18***</td>
<td>.23***</td>
<td>-.23***</td>
<td>-.26***</td>
<td>-.12**</td>
</tr>
<tr>
<td>Parent-reported</td>
<td>.16**</td>
<td>.21***</td>
<td>.37***</td>
<td>-.11**</td>
<td>-.06ns</td>
<td>-.12**</td>
</tr>
<tr>
<td>Warmth age 2</td>
<td><strong>- .34</strong>*</td>
<td><strong>- .18</strong>*</td>
<td>-.10 ns</td>
<td>.04ns</td>
<td><strong>.21</strong>*</td>
<td>.09 ns</td>
</tr>
<tr>
<td>Parent-reported</td>
<td>.17**</td>
<td>.22***</td>
<td><strong>.41</strong></td>
<td>-.08</td>
<td>-.06ns</td>
<td><strong>.18</strong></td>
</tr>
<tr>
<td>Warmth age 3</td>
<td>-.15**</td>
<td>-.19***</td>
<td>-.02ns</td>
<td>-.06ns</td>
<td><strong>.03ns</strong></td>
<td>.03ns</td>
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<tr>
<td>Observed harshness age 2</td>
<td>-.09ns</td>
<td>-.12**</td>
<td>-.10 ns</td>
<td>-.06ns</td>
<td>.13**</td>
<td>.03ns</td>
</tr>
<tr>
<td>Observed harshness age 3</td>
<td>-.15**</td>
<td>-.23***</td>
<td><strong>- .23</strong>*</td>
<td><strong>- .23</strong>*</td>
<td>.10**</td>
<td>.34***</td>
</tr>
<tr>
<td>Expressed criticism age 2</td>
<td>-.15**</td>
<td>-.23***</td>
<td>-.23***</td>
<td>.10**</td>
<td>.13**</td>
<td>-.11**</td>
</tr>
<tr>
<td>Expressed criticism age 3</td>
<td><strong>.21</strong></td>
<td><strong>.14</strong></td>
<td>.24**</td>
<td><strong>.11</strong></td>
<td><strong>.12</strong></td>
<td>-.16**</td>
</tr>
<tr>
<td>Expressed warmth age 2</td>
<td><strong>.10</strong></td>
<td><strong>.16</strong></td>
<td>.23**</td>
<td>.24**</td>
<td>-.06ns</td>
<td>-.12**</td>
</tr>
<tr>
<td>Expressed warmth age 3</td>
<td><strong>.10</strong></td>
<td><strong>.16</strong></td>
<td><strong>.23</strong></td>
<td><strong>.24</strong></td>
<td>-.12**</td>
<td>-.30**</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001. Note: partial correlations (shown italicized) controlling for parent education, parent income, child gender, intervention status, and living location of family (urban/semi-urban versus rural).

### 4.5. Thesis analytic strategy

Regression analyses for Studies 1 and 2 were tested in SPSS (version 18.0). Though the amount of missing data was small for individual measures (n = 622–731, for parent-report; n = 585–731, for observed), listwise deletion may have limited the power and biased estimation. Thus, to address missing data for analyses in SPSS, values were imputed (via the EM algorithm; covariance coverage=.75–1.00). All analyses for Studies 1 and 2 were run using both imputed and non-imputed datasets. The results were similar for both, although for brevity, the results reported are only for the imputed data (i.e., effective sample size of 731). Sources of missing data beyond attrition included families refusing to...
be videotaped, damaged videotapes, or families moving away and being unavailable for observations, although submitting self-report questionnaires via mail.

All remaining analyses (Studies 3-5) were run in Mplus 6.0 (Muthen & Muthen, 2010) with a full information maximum likelihood (FIML) approach. FIML efficiently accommodates missing data and provides less biased estimates than listwise or pairwise deletion in SPSS (Schafer & Graham, 2002). Using FIML procedures, the analyses for Studies 1-5 therefore included using all participants except when they were missing data on an independent predictor that cannot be estimated with missingness (e.g., a covariate, such as income or parent education) or a moderator variable (see Study 2, Section 3.5.2). For studies 3-5, model fit was evaluated using CFI, TLI, and RMSEA. For CFI and TLI, acceptable fit was defined using the conventional definition of values between .90-.94, with values ≥ .95 taken to indicate good fit (Bentler, 1990; Hu & Bentler, 1999). RMSEA values between .05-.10 were taken to indicate acceptable fit, and values of ≤ .05 to indicate a good fit (Browne & Cudeck, 1993; McDonald & Hu, 2002).

4.5.1. Study 1: Do positive and harsh parenting predict callous-unemotional behaviors in preschool children

The analytic strategy comprised three different steps. First, bivariate correlations between study variables were computed. Second, prediction of CU behavior by earlier parenting dimensions was assessed (either observed harsh parenting or observed positive parenting), using hierarchical regression models. In step one of the models, child gender and race, intervention status, parent education, parent income, and earlier CU behavior were entered as covariates. In step two, observed positive parenting or observed harsh parenting were entered in separate models (see Figure 7). This process was repeated for the following ages:
age 2 parenting predicting CU behavior at 3 and 4, and age 3 parenting predicting CU behavior at age 4. Earlier CU behavior was controlled for to account for potential parent-child reciprocity and to ensure models assessed prediction of child CU behavior by parenting, over and above child-driven effects relating to early manifestations of CU behavior. All models were also re-run to include either earlier measures of general externalizing behavior (CBCL) or specific aggressive-oppositional behavior (as well as CU behavior) as a covariate (see Section 4.3.4), to ensure that any effect of parenting on later CU behavior was over and above child-driven effects relating to both earlier CU behavior as well as more general externalizing behavior problems. Finally, it was necessary to control for intervention status as, after age 2, half the sample had been allocated to the FCU intervention.

**Figure 7: Hierarchical longitudinal regression models – earlier parenting predicting later CU behavior (controlling for covariates and earlier CU behavior)**

<table>
<thead>
<tr>
<th>Independent variables entered in regression model</th>
<th>Dependent variable: outcome of regression model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 covariates</td>
<td>Age 3 or 4 CU behavior</td>
</tr>
<tr>
<td>Intervention status</td>
<td></td>
</tr>
<tr>
<td>Child gender</td>
<td></td>
</tr>
<tr>
<td>Child race</td>
<td></td>
</tr>
<tr>
<td>Parent education</td>
<td></td>
</tr>
<tr>
<td>Parent income</td>
<td></td>
</tr>
<tr>
<td>Step 2 Earlier child behavior</td>
<td></td>
</tr>
<tr>
<td>Earlier CU behavior (age 2 or 3)</td>
<td></td>
</tr>
<tr>
<td>Earlier externalizing behavior (age 2 or 3)</td>
<td></td>
</tr>
<tr>
<td>Step 3 Parenting</td>
<td></td>
</tr>
<tr>
<td>Earlier observed harsh OR positive parenting (age 2 or 3)</td>
<td></td>
</tr>
</tbody>
</table>
Finally, in the third part of the analysis, models were run again including both observed positive and harsh parenting together in the final step (see Figure 8). As before, in step one of models, child gender and race, intervention status, parent education, parent income, and earlier CU behavior were entered as covariates. In step two, observed positive parenting and observed harsh parenting were both entered simultaneously. Indeed, while there is evidence that both parental harshness and positive behavior support contribute to the development of CU behavior, no previous studies have compared their unique effects using observed parenting measures in the same model. The process was repeated, as before, for the following ages: age 2 parenting (observed harsh and positive) predicting CU behavior at 3 and 4, and age 3 parenting (observed harsh and positive) predicting CU behavior at age 4. Earlier CU behavior was controlled for to account for potential parent-child reciprocity and to ensure models assessed prediction of child CU behavior by parenting, over and above child-driven effects relating to early manifestations of CU behavior. As before, models were re-run to include either earlier child aggressive-oppositional behavior or the general externalizing factor of the CBCL (as well as CU behavior) as a covariate (see Section 4.3.4), to ensure that any effect of parenting on later CU behavior was over and above child-driven effects relating to both earlier CU behavior as well as more general externalizing behavior problems.
4.5.2. Study 2: Do callous-unemotional behaviors moderate the association between parental warmth and harshness and the conduct problems of high-risk preschoolers?

Hierarchical multiple regression analysis was used to examine whether CU behavior moderated cross-sectional and longitudinal associations between parenting and conduct problems. For the cross-sectional analyses, conduct problems at age 3 was the dependent variable. In step 1, the following covariates were entered: intervention group status, child race and gender, child conduct problems at baseline (age 2), parent education, and income. In step 2, the main effects were entered: age 3 CU behavior, age 3 parental harshness, and age 3 parental warmth. Finally in step 3, the product terms of ‘CU behavior × parental harshness’ and ‘CU behavior × parental warmth’ were entered to test interaction effects.
Separate models were run for the observed/expressed versus parent-reported measures of parenting although harsh and warm parenting were considered simultaneously. For longitudinal analyses, conduct problems at age 4 was the dependent variable. In step 1, the following covariates were entered: intervention group status, child race and gender, child conduct problems at baseline (age 2), parent education and income. In step 2, the main effects were entered: age 3 CU behavior, age 3 parental harshness, and age 3 parental warmth. Finally in step 3, the product terms of ‘CU behavior × parental harshness’ and ‘CU behavior × parental warmth’ were entered simultaneously to test interaction effects. As before, separate models were run for the observed/expressed versus parent-reported measures of parenting.

A summary of the steps for each of the four models tested (cross-sectional and longitudinal models testing observed/expressed versus parent-reported measures of parenting) is presented in Figure 9. Significant interaction effects were probed by testing whether the slopes of the regression lines at low and high levels of CU behavior differed significantly from zero (Cohen, Cohen, West, & Aiken, 2003). High and low groups were created based on age 3 CU behavior scores (‘high’, ≥1 SD above the sample mean, $N = 144$, ‘low’, ≤ 1 SD below the sample mean, $N = 510$). Regression equations were used to plot mean values for conduct problems for children with higher versus low levels of the parenting variables as a function of the level of CU behavior.
4.5.3. Study 3: Bidirectional associations between dimensions of parental warmth, callous-unemotional behaviors and conduct problems in high-risk preschoolers.

To explore longitudinal, reciprocal associations between parental warmth, CU behavior and conduct problems, a series of autoregressive models of cross-lagged and simultaneous effects were tested. In each model, scores for all variables at age 3 were simultaneously regressed onto scores for all variables at age 2. Within each age, variables were correlated, to control for their overlap at each time point. All models included the following covariates: intervention group, child gender, child race, parent education, parent income and whether the parent was the child’s biological parent. Separate models were run, (a) to test associations between the two different methods of assessing parental warmth (expressed
versus directly observed) and CU behavior in 2-way models (Figure 10a) and, (b) to test associations between the two different methods of assessing parental warmth (expressed versus directly observed), CU behavior, and conduct problems in 3-way models (Figure 10b). As such, four models were tested in total. First, this enabled comparison of results according to the two assessment methods for parental warmth. Second, comparison of models with and without conduct problems included enabled testing of the hypothesis that warmth may be uniquely related to child CU behaviors, rather than to conduct problems in general (see Chapter 2).
4.5.4. Study 4: Factor structure of the Inventory of Callous-unemotional traits at age 9

The factor analytic models used in this thesis to examine the psychometric properties of the ICU in this sample were conducted using CFA in MPlus 6.0 (Muthen & Muthen, 2010) using Weighted Least Squares Means and Variance adjusted for the categorical data of method of estimation. In total, four different sets of CFA were conducted to test which
models applied by previous studies fit the data best (Essau et al., 2006; Fanti et al., 2009; Feilhauer et al., 2012; Kimonis et al., 2008b; Roose et al., 2010). First, a unidimensional (single factor) model (Model 1) was tested as a baseline model, where all items loaded onto a single callous-unemotional factor. This model was the most parsimonious and was tested to be a comparison for the other multifactorial models. Second, a model was estimated that required items to load onto three intercorrelated factors (callousness, uncaring, and unemotional) (Model 2). This model solution has received empirical support in one previous study (Ezpeleta, et al., 2012). Third, a three-Bifactor model (Model 3), which has received support in four previous studies (e.g., Essau et al., 2008) was estimated (i.e., items load onto both a general factor and three uncorrelated subfactors). Figure 11 summarizes the theorized structure for models 2 (Figure 11a) and 3 (Figure 11b; i.e., correlated three factor versus uncorrelated three-BiFactor model). A fourth model was estimated as a variant of model 3, in which correlations between error terms (residuals) were added according to modification indices (Model 4). Correlated residuals were estimated, (a) if modification indices indicated that this would reduce model chi-square by ≥ 20 points, and (b) if it made theoretical sense to estimate the parameter following a review of the item descriptions. Finally, the internal consistency of scores for subscales and total ICU scores obtained from factor analytic analyses were assessed using Cronbach’s alpha. Values of $\alpha \geq .80$ were considered adequate (Nunnally & Bernstein, 1994).
Figure 11: Theorized correlated three-factor model versus three-BiFactor model with general factor, and uncorrelated subfactors

(a) Correlation three-factor model

11
4
9
20
18
7
12
21
2
10
8

23
15
3
24
5
16
17
13

14
19
1
6
22

Callousness

Uncaring

Unemotional
4.5.5. Study 5: The influence of child behavior and parenting during the preschool years on the development of callous-unemotional traits at age 9

To test the influence of early child behavior and parenting practices on CU traits at age 9, various analyses were carried, which develop and build on the models tested in Studies 1-4. First, bivariate correlations between main study variables were computed. Specifically, bivariate correlations were computed between all four measures of child behaviors at 2-3 years old (CU behavior, conduct problems, externalizing behavior, and aggressive-
oppositional behavior; see Section 3.3) and CU traits at age 9 (see Study 4). Next, bivariate correlations between different measures of parenting at ages 2-3 (observed harsh parenting, directly observed warmth, and expressed warmth; see Sections 3.5, 4.2, 4.3, and 4.4) and CU traits at age 9 were computed. In particular, affective dimensions of parenting were tested that had emerged as being important to the development of CU behaviors during the toddler years as tested in Studies 1-3. In this way, Study 5 was able to test specifically the effects of early affective parent-child interactions during the toddler years on later CU traits during middle childhood. Bivariate associations were computed for both individual subfactor and total ICU scores.

Second, the prediction of CU traits at age 9 by age 2-3 year old child behavior (CU behavior versus general behavior problems) and affective dimensions of parenting was tested. Specifically, through the use of path models, the three uncorrelated subfactors and total ICU scores at age 9 (i.e., three-Bifactor model identified in Study 4) were regressed onto the three-way reciprocal and simultaneous effects models of associations between of parental affect and child behavior at ages 2-3 (identified in Study 3). Three separate path models were specified that tested prediction of CU traits at age 9 by longitudinal and reciprocal effects between child behavior and affective measures of parenting at ages 2-3 for, (a) observed parental harshness (see Section 4.3.6 and Studies 1 and 2), (b) expressed parental warmth (see Section 4.4.3 and Studies 2 and 3), and (c) directly observed parental warmth (see Section 4.4.4 and Study 3). The three subfactors and general CU traits factor identified in the three-Bifactor model in Study 4 represent joint (but uncorrelated) outcomes. As such, models were run that attempted to test whether parental and child affective interactions at ages 2-3 (controlling for their concurrent overlap) predicted later
displays of callousness, unemotionality, uncaring, and general CU traits at age 9 (see Figure 12).

**Figure 12: Theorized path model testing prediction of uncorrelated subfactor and total ICU scores at age 9 by reciprocal, longitudinal associations between parental affective behavior, child CU behaviors and child conduct problems at ages 2-3**

*Note. Theorized model shows all specified pathways. Variables at all ages (2, 3 and 9 years old) were regressed onto child gender, child race, parent income, and parent education. All variables at ages 3 and 9 were also regressed onto intervention group. Outcomes variables of ICU subfactor and total scores at age 9 are specified to be uncorrelated as per three-Bifactor model identified in Study 4 of this thesis and in previous studies (e.g., Fanti et al., 2009; Kimonis et al., 2008b; see Sections 4.4.1 and 4.5.4)*
Chapter 5: Results
5.1. Descriptive statistics for variables (Studies 1-5)

5.1.1. Demographics (used as covariates in analyses)

Within questionnaires administered at the start of home visits, primary caregivers answered questions about general demographic factors. These included questions pertaining to education, family income, race and ethnicity, substance use, and relationship status. Across Studies 1-5, the following demographic variables were used as covariates in analyses: intervention group (i.e., whether the family had been randomized to receive the intervention; see Chapter 4, Section 4.2.5), child gender, child race, parent education, and family income. A summary of the sample statistics for these variables is shown in Table 20.

Table 20: Summary of demographic variables used as covariates in analyses for Studies 1-5 in thesis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>n</th>
<th>% of sample</th>
<th>Variable</th>
<th>Categories</th>
<th>n</th>
<th>% of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention status</td>
<td>Intervention</td>
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<td>49.8</td>
<td>Child gender</td>
<td>Male</td>
<td>369</td>
<td>50.5</td>
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<td></td>
<td>Control group</td>
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<td>50.2</td>
<td></td>
<td>Female</td>
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<td>49.5</td>
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<tr>
<td>Child race</td>
<td>White</td>
<td>366</td>
<td>50.1</td>
<td>Gross Family</td>
<td>$4999 or less</td>
<td>83</td>
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</tr>
<tr>
<td></td>
<td>Black, African-American</td>
<td>204</td>
<td>27.9</td>
<td>income (including</td>
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<td>17.4</td>
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<tr>
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<td>child support and</td>
<td>$10000-$14999</td>
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<td></td>
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<td>$20000-$24999</td>
<td></td>
<td>106</td>
<td>14.5</td>
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<td>Parent education</td>
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<td>4.4</td>
<td></td>
<td>$25000-$29999</td>
<td>59</td>
<td>8.1</td>
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<td></td>
<td>Partial High School</td>
<td>140</td>
<td>19.2</td>
<td></td>
<td>$30000-$39999</td>
<td>46</td>
<td>6.3</td>
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<td>2.6</td>
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<td>$50000-$59999</td>
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<td>.8</td>
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<td></td>
<td>Junior College</td>
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<td>$60000-$69999</td>
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<td>.1</td>
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<td>$70000-$79999</td>
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</tbody>
</table>
Within analyses, variables were coded in different ways. First, intervention status was coded as, intervention group = 1; control group = 0. Second, gender was coded as, male = 1; female = 0. The race variable was coded in two different ways, and analyses repeated using each method, (a) non-white = 1; white = 0, or, (b), non-Black, African-American/biracial = 1; Black, African-American/biracial = 0. Third, parent education was recoded as: Junior High or less = 0, Partial High School = 1, Graduated High School = 2, Partial College = 3, Junior College = 4, Graduated College = 5. Finally, given the distribution, the income variable was recoded to reflect the distribution and better examine the effect of income on outcomes, less than $4999-$9999 = 0 (~ 30% of sample), $10000-$19999 = 1 (~ 37% of sample), $20000 or more = 2 (~ 33% of sample). It is worth noting again that a large proportion of the sample were of low income, with around 80% of families having an annual income of less than $25000. In addition to the covariates outlined above, Study 3 included whether the parent was the biological parent of the child (yes = 1; no = 0) in models. However, the majority of primary caregivers were biological mothers (96% at age 2 and 3) so it is unclear how much sensitivity this variable provided.

The decision to include these demographic covariates in models was influenced by three factors. First, demographic covariates were included if they had consistently been included by studies reviewed in the systematic review described in Chapter 3. Second, demographic covariates were included if there was other strong evidence to support the notion that they might be related to the outcomes of interest. For example, male gender is a consistent predictor of more severe conduct problems across development (Loeber et al., 1998). Third, aspects of parental characteristics or the broader family context were included in models to ensure that any effect of parenting on child behavior would be over and above relevant confounds (e.g., parent education, family income).
5.1.2. Measures of child behavior

Across Studies 1-5 of the thesis, there were five different measures of child behavior. At ages 2 and 3, the following measures were used: (a) parent-reports of the Externalizing Factor of the Child Behavior Checklist for ages 1.5-5 (CBCL; Achenbach & Rescorla, 2001) to index general externalizing problems, (b) Parent reports for the Problem Behavior Factor of the Eyberg Child Behavior Inventory (ECBI; Robinson, Eyberg, & Ross) to index conduct problems, (c) An aggressive-oppositional factor derived from taking the mean of 8 items of the CBCL (Dishion et al., manuscript in submission) to index aggressive-oppositional behavior (see Chapter 3, Section 2.3). There were different theoretical justifications for use of each of these different measures of child behavior. In Study 1, models were re-run to assess the effect of controlling for, (a) a general measure of externalizing behavior (CBCL Externalizing Factor) versus (b) a more precise index of aggressive-oppositional behavior (8-item CBCL aggressive oppositional factor). By re-running models using both of these variables, Study 1 therefore incorporated a sensitivity analysis of the effects of general externalizing versus more specific aggressive/oppositional behaviors on parent behavior (and how this affected the prediction of later CU behavior). In Studies 2 and 3, models were run using an index of early conduct problems (Eyberg measure). As such, Studies 2 and 3 were comparable with previous studies that have tested the association between parenting and CU behavior in samples of older, clinic-referred children, often with diagnosable levels of conduct problems. Study 5 similarly compared the effects of including a measure of conduct problems (Eyberg) versus aggressive-oppositional behavior in models.
In addition to these general measures of child problem behavior, two measures of CU behavior are used in the thesis. First, at ages 2-4, a measure of child CU behavior was derived for the thesis using parent reports on five (summed) items from the CBCL (see Section 4.4.1), which built on the work of Hyde et al. (2013). Finally, at age 9, parents completed the Inventory of Callous Unemotional Traits (ICU; Frick, 2004) to provide a measure of child CU traits in preadolescence (see Section 4.5.4). Study 4 represents a test of the factor structure of the ICU, which has previously been found to comprise specific factors of ‘callousness’, ‘unemotional’, and ‘callousness’, as well as a general ‘CU traits’ factor.

Table 21 presents descriptive statistics for each of measures of general child behavior problems during toddlerhood (externalizing behavior, emerging conduct problems, and aggressive-oppositional behavior). In addition, Table 21 presents descriptives for the two measures of CU traits (CU behavior at ages 2-4 and total CU traits score at age 9). Further, Table 22 presents bivariate correlations between all the measures of child behavior problems from ages 2-9 assessed in Studies 1-5 of this thesis.

**Table 21: Descriptive statistics for child behavior measures used in Studies 1-5 of thesis**

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>M(SD)</th>
<th>Range</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externalizing behavior (CBCL) age 2</td>
<td>730</td>
<td>20.70 (7.30)</td>
<td>1.00-46.00</td>
<td>.86</td>
</tr>
<tr>
<td>Externalizing behavior (CBCL) age 3</td>
<td>657</td>
<td>17.74 (8.05)</td>
<td>0.00-42.00</td>
<td>.86</td>
</tr>
<tr>
<td>Conduct Problems (Eyberg) age 2</td>
<td>729</td>
<td>14.18 (6.49)</td>
<td>.00-33.00</td>
<td>.84</td>
</tr>
<tr>
<td>Conduct Problems (Eyberg) age 3</td>
<td>651</td>
<td>14.36 (7.85)</td>
<td>.00-36.00</td>
<td>.94</td>
</tr>
<tr>
<td>Aggressive-oppositional behavior age 2 (mean)</td>
<td>730</td>
<td>.65 (.34)</td>
<td>.00-1.88</td>
<td>.71</td>
</tr>
<tr>
<td>Aggressive-oppositional behavior age 3 (mean)</td>
<td>658</td>
<td>.55 (.35)</td>
<td>.00-1.75</td>
<td>.75</td>
</tr>
<tr>
<td>CU behavior age 2</td>
<td>722</td>
<td>3.85 (2.03)</td>
<td>.00-10.00</td>
<td>.56</td>
</tr>
<tr>
<td>CU behavior age 3</td>
<td>654</td>
<td>3.01 (1.93)</td>
<td>.00-9.00</td>
<td>.62</td>
</tr>
<tr>
<td>CU traits (ICU) age 9 (total score; see Study 4)</td>
<td>533</td>
<td>20.51 (9.21)</td>
<td>1.00-53.00</td>
<td>.87</td>
</tr>
</tbody>
</table>
### Table 22: Bivariate correlations between measures of child behavior used in Studies 1-5 of thesis

<table>
<thead>
<tr>
<th></th>
<th>CBCL3</th>
<th>Eyberg2</th>
<th>Eyberg3</th>
<th>AggOpp2</th>
<th>AggOpp3</th>
<th>CU2</th>
<th>CU3</th>
<th>ICU9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externalizing behavior (CBCL) age 2</td>
<td></td>
<td>.60***</td>
<td>.38***</td>
<td>.43***</td>
<td>.83***</td>
<td>.69***</td>
<td>.49***</td>
<td>.22***</td>
</tr>
<tr>
<td>Externalizing behavior (CBCL) age 3</td>
<td>.29***</td>
<td>.66***</td>
<td>.56***</td>
<td>.87***</td>
<td>.42***</td>
<td>.77***</td>
<td>.24***</td>
<td></td>
</tr>
<tr>
<td>Conduct Problems (Eyberg) age 2</td>
<td>.42***</td>
<td>.34***</td>
<td>.27***</td>
<td>.31***</td>
<td>.24***</td>
<td>.13**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct Problems (Eyberg) age 3</td>
<td></td>
<td>.41***</td>
<td>.58***</td>
<td>.28***</td>
<td>.55***</td>
<td>.15**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive-oppositional behavior age 2</td>
<td>.55***</td>
<td>.53***</td>
<td>.45***</td>
<td>.25***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive-oppositional behavior age 3</td>
<td>.37***</td>
<td>.65***</td>
<td>.24***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU behavior age 2</td>
<td></td>
<td>.46***</td>
<td>.24***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU behavior age 3</td>
<td></td>
<td></td>
<td>.28***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001. Stability of measures indicated in **bold type.**

#### 5.1.3. Measure of parenting behavior and parental affect

Across Studies 1-5 of this thesis, there were a variety of different measures used to assess parenting behavior and parental affect, and the affective quality of the parent-child relationship. First, parents reported on the 5-item positive subscale of the Adult-Child Relationship Scale at ages 2 and 3 (ACRS; modified from the Student-Teacher Relationship Scale; Pianta, 2001) (see Section 4.3.5). Second, parents reported on their harshness towards their child at ages 2 and 3 using the over-reactivity subscales of the Parenting Scale (Arnold et al., 1993) (see Section 4.3.5). Third, parental harshness was also assessed at ages 2 and 3 using a multi-informant observed composite measure that combined micro- and macro-social coding (Moilanen et al., 2010) (See Section 4.3.6). Fourth, a composite for observed positive parenting at ages 2 and 3 was derived from...
multi-informant observed measures (Waller et al., manuscript in preparation) (see Section 4.4.2). Fifth, observed parental warmth was assessed at ages 2 and 3 using a six-item composite of items rated following the home visit by the home assessor, using a modified version of the IT-HOME (Caldwell & Bradley, 1984) (see Section 4.4.4). Finally, expressed parental warmth was assessed by summing the 5 positive items derived from coding parental five minute speech samples using the Family Affective Attitudes Rating Scale (FAARS; Bullock & Dishion, 2007; Waller et al., 2012a) (see description of measure validation in Section 4.4.3). Table 23 presents an overview of each of these different measures of parenting/parental behavior. Further, Table 24 presents the descriptive statistics for each of the measures assessing parenting and positive parental affect. Finally, simple, bivariate correlations between all the measures of parenting are presented in Table 24.

Table 23: Overview of different measures of parenting used throughout thesis

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
<th>Location</th>
<th>Study used in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed positive parenting</td>
<td>Multi-method, multi-informant observed measure assessing parental “positive behavior support” (i.e., incorporating proactive structuring and behavior management)</td>
<td>Pages 162-163; 193-199</td>
<td>Study 1</td>
</tr>
<tr>
<td>Observed harsh parenting</td>
<td>Multi-method observed measure of harshness including displays of parental negative physical and verbal behavior towards child</td>
<td>Pages 162-163; 172-173; 184-185</td>
<td>Studies 1 and 5</td>
</tr>
<tr>
<td>Expressed parental warmth</td>
<td>Positive subscale from coding of parental five-minute speech samples, designed to assess positive parental affect and warmth, and positive beliefs/attitudes about child</td>
<td>Pages 163-165; 166-167; 172-173; 199-212</td>
<td>Studies 2, 3, &amp; 5</td>
</tr>
<tr>
<td>Directly observed parental warmth</td>
<td>Specific observed measure of warmth from global coding scheme, following 2-3 hour visit in the home by independent assessor</td>
<td>Pages 166-167; 172-173; 212-217</td>
<td>Studies 3 and 5</td>
</tr>
<tr>
<td>Parent-reported warmth</td>
<td>5-item ACRS subscale assessing parent-reported positive parent-child interactions and positive relationship</td>
<td>Pages 163-165; 183-184</td>
<td>Study 2</td>
</tr>
<tr>
<td>Parent-reported harshness</td>
<td>10-item O’Leary over-reactivity subscale assessing parent-reported displays of negative physical and verbal responses</td>
<td>Pages 163-165; 183-184</td>
<td>Study 2</td>
</tr>
</tbody>
</table>
Table 24: Descriptive statistics for parenting measures used in Studies 1-3 and 5 of thesis

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>M(SD)</th>
<th>Range</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent-reported warmth (ACRS) age 2</td>
<td>730</td>
<td>8.12 (3.00)</td>
<td>5.00-20.00</td>
<td>.61</td>
</tr>
<tr>
<td>Parent-reported warmth (ACRS) age 3</td>
<td>658</td>
<td>8.63 (3.16)</td>
<td>5.00-23.00</td>
<td>.65</td>
</tr>
<tr>
<td>Parent-reported harshness age 2</td>
<td>718</td>
<td>2.68 (.77)</td>
<td>1.00-5.00</td>
<td>.56</td>
</tr>
<tr>
<td>Parent-reported harshness age 3</td>
<td>658</td>
<td>2.73 (.80)</td>
<td>1.00-5.00</td>
<td>.58</td>
</tr>
<tr>
<td>Observed positive parenting age 2</td>
<td>731</td>
<td>-.003 (.74)</td>
<td>-2.49-1.85</td>
<td>.57</td>
</tr>
<tr>
<td>Observed positive parenting age 3</td>
<td>632</td>
<td>-.001 (.76)</td>
<td>-2.36-2.03</td>
<td>.63</td>
</tr>
<tr>
<td>Observed harshness age 2</td>
<td>606</td>
<td>.00 (5.12)</td>
<td>-4.67-31.43</td>
<td>.75</td>
</tr>
<tr>
<td>Observed harshness age 3</td>
<td>585</td>
<td>.00 (5.13)</td>
<td>-4.25-35.29</td>
<td>.75</td>
</tr>
<tr>
<td>Observed warmth age 2 (HOME)</td>
<td>693</td>
<td>15.99 (2.79)</td>
<td>5.00-19.00</td>
<td>.73</td>
</tr>
<tr>
<td>Observed warmth age 3 (HOME)</td>
<td>616</td>
<td>3.97 (1.49)</td>
<td>5.00-19.00</td>
<td>.77</td>
</tr>
<tr>
<td>Observed warmth age 2</td>
<td>647</td>
<td>.00 (5.12)</td>
<td>-2.36-2.03</td>
<td>.69</td>
</tr>
<tr>
<td>Observed warmth age 3</td>
<td>559</td>
<td>.00 (5.12)</td>
<td>-2.36-2.03</td>
<td>.67</td>
</tr>
<tr>
<td>Expressed warmth (FAARS) age 2</td>
<td>606</td>
<td>.00 (5.12)</td>
<td>-2.36-2.03</td>
<td>.69</td>
</tr>
<tr>
<td>Expressed warmth (FAARS) age 3</td>
<td>559</td>
<td>.00 (5.12)</td>
<td>-2.36-2.03</td>
<td>.67</td>
</tr>
</tbody>
</table>

Table 25: Bivariate correlations between parenting measures used in Studies 1-3 and Study 5 of thesis

<table>
<thead>
<tr>
<th>Parent-reported</th>
<th>Observed</th>
<th>Expressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Warmth (P) age 2</td>
<td>.37***</td>
<td>-.05ns</td>
</tr>
<tr>
<td>3. Warmth (P) age 3</td>
<td>-.16***</td>
<td>-.22***</td>
</tr>
<tr>
<td>4. Harsh (P) age 2</td>
<td>.54***</td>
<td>-.01ns</td>
</tr>
<tr>
<td>5. Harsh (P) age 3</td>
<td>-.03ns</td>
<td>-.14***</td>
</tr>
<tr>
<td>6. Positive parenting (O) age 2</td>
<td>.55***</td>
<td>-.35***</td>
</tr>
<tr>
<td>7. Positive parenting (O) age 3</td>
<td>-.27***</td>
<td>-.30***</td>
</tr>
<tr>
<td>8. Harsh (O) age 2</td>
<td>.21***</td>
<td>-.33***</td>
</tr>
<tr>
<td>9. Harsh (O) age 3</td>
<td>-.19***</td>
<td>-.26***</td>
</tr>
<tr>
<td>10. Warmth (O) age 2</td>
<td>.48***</td>
<td>.21***</td>
</tr>
<tr>
<td>11. Warmth (O) age 3</td>
<td>.17***</td>
<td>.20***</td>
</tr>
<tr>
<td>12. Warmth (E) age 2</td>
<td>.32***</td>
<td></td>
</tr>
</tbody>
</table>

Note. P = parent-reported; O = observed; E = expressed. * p < .05; ** p < .01; *** p < .001. Stability in measures indicated in bold type.
Table 25 shows that there were modest-significant correlations within measures from ages 2-3 (*range, r = .21-.55, p < .001*). Stability was stronger for parent-reported measures than for observed or expressed measures. At ages 2 and 3, parent-reported warmth showed modest-moderate correlations with expressed (FAARS coding; *r* = .15, *p* < .001; *r* = .15, *p* < .001 respectively) and directly observed warmth (HOME ratings; *r* = .16, *p* < .001; *r* = .23, *p* < .001 respectively). Directly observed and expressed warmth also showed modest-moderate correlations at ages 2 and 3 (*r* = .21, *p* < .001; *r* = .20, *p* < .001 respectively). Finally, there were strong correlations between the general measure of positive parenting and the HOME index of observed warmth at ages 2 and 3 (*r* = .68, *p* < .001; *r* = .70, *p* < .001 respectively). However, the correlations were not so high as to suggest that there was no utility in separation of the global HOME ratings of warmth from the multi-method observed composite of positive behavior support (see Sections 4.4.3 and 4.4.4). Further, an examination of the inter-correlations between subscales of the observed positive parenting measure with the HOME warmth subscales highlighted that the high correlation with the total scale may have been driven by the HOME subscale in particular (for example, at age 2, correlations between HOME warmth subscale and HOME, RACS, and COIMP individual subscales of the observed positive parenting were *r* = .86, *p* < .001, *r* = .29, *p* < .001, and *r* = .34, *p* < .001. These correlations highlight the utility of separating the HOME warmth items from the other measures assessing more general aspects of positive parenting (including proactiveness) using alternative approaches, in line with the theoretical proposals outlined in earlier section of this thesis (for example, see Section 1.1.2 and Section 4.1).
5.2. Study 1: Do observed positive and harsh parenting predict callous-unemotional behaviors in preschool children?

5.2.1. Bivariate analyses

First, cross-sectional and longitudinal bivariate correlations were computed between the main variables in Study 1. Table 26 presents bivariate correlations between the measures of CU behavior at ages 2-4 with the two alternative measures of problem child behavior (general externalizing (CBCL) versus aggressive-oppositional behavior at ages 2-3). Table 27 presents bivariate correlations between the observed measures of parenting (harsh and positive) with the child behavior measures (CU behavior at ages 2-4 and externalizing (CBCL) versus specific aggressive-oppositional behavior at ages 2 and 3). The child problem behavior measures (externalizing and aggressive-oppositional) showed moderate-strong cross-sectional and longitudinal correlations with CU behavior. The associations were similar in magnitude to the correlations reported between CU traits and conduct problems in older samples of children and adolescents (Frick & White, 2008). In addition, there were moderate associations between the observed parenting variables (positive and harsh) and concurrent and later child CU behavior. These associations suggest that regression models need to account for the effects of general child problem behavior (i.e., externalizing (CBCL) or aggressive-oppositional behavior) on later CU behavior, as well as concurrent associations between child behavior and parenting (see analytic strategy for Study 1, Section 4.5.2). The effect of controlling for earlier CU behavior versus controlling for both earlier CU behavior and concurrent externalizing versus specific aggressive-oppositional behavior was therefore tested.
Table 26: Bivariate correlations between child behavior measures in Study 1

<table>
<thead>
<tr>
<th></th>
<th>CU behavior age 2</th>
<th>CU behavior age 3</th>
<th>CU behavior age 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externalizing behavior (CBCL) age 2</td>
<td>.69***</td>
<td>.49***</td>
<td>.40***</td>
</tr>
<tr>
<td>Externalizing behavior (CBCL) age 3</td>
<td>.42***</td>
<td>.77***</td>
<td>.51***</td>
</tr>
<tr>
<td>Aggressive-oppositional behavior age 2</td>
<td>.53***</td>
<td>.45***</td>
<td>.38***</td>
</tr>
<tr>
<td>Aggressive oppositional behavior age 3</td>
<td>.37***</td>
<td>.65***</td>
<td>.45***</td>
</tr>
</tbody>
</table>

*p < .05; ** p < .01; *** p < .001.

Table 27: Bivariate correlations between observed parenting measures and child measure measures in Study 1

<table>
<thead>
<tr>
<th></th>
<th>CU behavior age 2</th>
<th>CU behavior age 3</th>
<th>CU behavior age 4</th>
<th>Externalizing behavior (CBCL) age 2</th>
<th>Externalizing behavior (CBCL) age 3</th>
<th>Aggressive-oppositional behavior age 2</th>
<th>Aggressive-oppositional behavior age 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed positive parenting age 2</td>
<td>-.23***</td>
<td>-.20***</td>
<td>-.21***</td>
<td>-.16***</td>
<td>-.20***</td>
<td>-.13***</td>
<td>-.19***</td>
</tr>
<tr>
<td>Observed positive parenting age 3</td>
<td>-.22</td>
<td>-.25***</td>
<td>-.24***</td>
<td>-.12***</td>
<td>-.22</td>
<td>-.11***</td>
<td>-.23***</td>
</tr>
<tr>
<td>Observed harsh parenting age 2</td>
<td>.12**</td>
<td>.16***</td>
<td>.21***</td>
<td>.16***</td>
<td>.16***</td>
<td>.16***</td>
<td>.16***</td>
</tr>
<tr>
<td>Observed harsh parenting age 3</td>
<td>.10*</td>
<td>.23***</td>
<td>.21***</td>
<td>.08*</td>
<td>.23***</td>
<td>.07ns</td>
<td>.23***</td>
</tr>
</tbody>
</table>

*(p < .05; ** p < .01; *** p < .001.

5.2.2. Regression analyses (observed parental harshness)

Hierarchical regression models were tested to examine the longitudinal prediction of CU behavior by observed parenting. First, observed parental harshness was found to consistently predict later CU behavior, controlling for earlier CU behavior (Table 28). The model predicting age 3 CU behavior from age 2 measures was significant ($R^2=.23$, $F(8,579) = 21.50$, $p < .001$) and observed parental harshness contributed uniquely to the model in the
final step ($\Delta R^2 = .01, \beta = .10, p < .01$). The model predicting age 4 CU behavior from age 2 measures was also significant ($R^2 = .19, F(8,541) = 16.37, p < .001$) and in the final step, age 2 observed parental harshness added unique variance ($\Delta R^2 = .02, \beta = .15, p < .001$). The model predicting age 4 CU behavior from age 3 measures was significant ($R^2 = .31, F(8,531) = 30.82, p < .001$) and there was a trend to significance for age 3 observed parental harshness to add unique variance ($\beta = .07, p < .10$). Earlier CU behavior was a consistent predictor in models. The results therefore provide support for the role of early harsh parenting in the development of CU behavior, and are consistent with previous studies that have demonstrated an association between negative parenting practices and CU trait development in older children (e.g., Fontaine et al., 2011; Pardini et al., 2007).

Table 28: Longitudinal prediction of CU behavior by observed harsh parenting controlling for earlier child behavior

<table>
<thead>
<tr>
<th>predictors</th>
<th>Outcome of regression models</th>
<th>Outcome of regression models</th>
<th>Outcome of regression models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CU behavior age 3</td>
<td>CU behavior age 4</td>
<td>CU behavior age 4</td>
</tr>
<tr>
<td></td>
<td>$R^2 = .23, p &lt; .001$</td>
<td>$R^2 = .19, p &lt; .001$</td>
<td>$R^2 = .31, p &lt; .001$</td>
</tr>
<tr>
<td>Age 2 CU behavior</td>
<td>B(SE)</td>
<td>$\beta$</td>
<td>B(SE)</td>
</tr>
<tr>
<td></td>
<td>.43 (.04)</td>
<td>.44***</td>
<td>.47 (.05)</td>
</tr>
<tr>
<td>Age 3 CU behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 2 observed parental</td>
<td>B(SE)</td>
<td>$\beta$</td>
<td>B(SE)</td>
</tr>
<tr>
<td>harshness</td>
<td>.41 (.16)</td>
<td>.10†</td>
<td>.84 (.23)</td>
</tr>
<tr>
<td>Age 3 observed parental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>harshness</td>
<td>B(SE)</td>
<td>$\beta$</td>
<td>B(SE)</td>
</tr>
<tr>
<td></td>
<td>.49 (.27)</td>
<td>.07†</td>
<td></td>
</tr>
</tbody>
</table>

| predictors                      | Outcome of regression models | Outcome of regression models | Outcome of regression models |
|                                 | CU behavior age 3            | CU behavior age 4            | CU behavior age 4            |
|                                 | $R^2 = .28, p < .001$        | $R^2 = .28, p < .001$        | $R^2 = .32, p < .001$        |
| Age 2 CU behavior               | B(SE)                        | $\beta$                     | B(SE)                        | $\beta$                     |
|                                 | .21 (.05)                    | .22**                       | .25 (.07)                    | .20**                       |
| Age 3 CU behavior               |                              |                              |                              |                              |
| Age 2 externalizing behavior    | B(SE)                        | $\beta$                     | B(SE)                        | $\beta$                     |
| (CBCL)                          | .09 (.01)                    | .33***                      | .09 (.02)                    | .24***                      |
| Age 3 externalizing behavior    |                              |                              |                              |                              |
| (CBCL)                          | .07 (.02)                    | .21**                       |
| Age 2 observed parental         | B(SE)                        | $\beta$                     | B(SE)                        | $\beta$                     |
| harshness                       | .28 (.15)                    | .07†                        | .73 (.22)                    | .12**                       |
| Age 3 observed parental         |                              |                              |                              |                              |
| harshness                       | B(SE)                        | $\beta$                     | B(SE)                        | $\beta$                     |
|                                 | .41 (.27)                    | .06 ns                      |

*Intervention group, parent education, parent income, child race, and child gender were included in step 1 of models, but not shown in table. †p < .10; ‡p < .05; §§p < .01; §§§p < .001.
Models were run again including earlier externalizing behavior (CBCL) as a covariate. In all models, both earlier CU behavior and externalizing (or aggressive-oppositional) behavior were consistent predictors of later CU behavior. Further, controlling for both earlier CU behavior and externalizing behavior somewhat changed the pattern of findings in relation to prediction by observed parental harshness. The model predicting age 3 CU behavior from age 2 measures was significant ($R^2= .28$, $F(9,579) = 25.47, p < .001$) but there was only a trend to significance for age 2 observed parental harshness to add unique variance ($\beta = .06, p < .10$). The model predicting age 4 CU behavior from age 2 measures was significant ($R^2= .21$, $F(9,541) = 17.38, p < .001$) and in the final step age 2 observed parental harshness added unique variance ($\Delta R^2= .02, \beta = .13, p < .01$). The model predicting age 4 CU behavior from age 3 measures was significant ($R^2= .32$, $F(9,530) = 29.25, p < .001$) but the contribution of age 3 observed harsh parenting was not significant. When the specific aggressive-oppositional behavior measure was included, the pattern of results was similar (Table 28 only includes data for externalizing behavior (CBCL) for brevity). Specifically, while both CU behavior and general child behavior problems were predictors, observed parental harshness did not consistently predict later CU behavior over and above stability in child behavior (Table 28).

5.2.3. Regression analyses (observed positive parenting)

In a second set of hierarchical regression models, the effect of observed positive parenting on later CU behavior was tested. Initially models were run only controlling for earlier CU behavior and observed positive parenting was found to be a consistent predictor of later CU behavior (Table 29). The model predicting age 3 CU behavior from age 2 measures was significant ($R^2= .22$, $F(8,646) = 23.93, p < .001$) and observed positive parenting
contributed uniquely to the model in the final step ($\Delta R^2 = .01, \beta = -11, p < .01$). The model predicting age 4 CU behavior from age 2 measures was also significant ($R^2 = .18, F(8,616) = 18.24, p < .001$) and in the final step age 2 observed positive parenting added unique variance ($\Delta R^2 = .01, \beta = -11, p < .01$). Finally, the model predicting age 4 CU behavior from age 3 measures was significant ($R^2 = .32, F(7,581) = 37.88, p < .001$) and there was a trend to significance for age 3 observed positive parenting to add a small amount of unique variance ($\Delta R^2 = .004, \beta = -.07, p = .05$). As such, the results provide support for the notion that early positive parenting (including aspects of parental warmth, proactive parenting, and parental structuring of the environment) are important to the development of CU behavior.

As before, models were run again to include earlier externalizing behavior (CBCL) as a covariate (see Table 29). In all models, both earlier CU behavior and externalizing (or aggressive-oppositional) behavior were consistent predictors of later CU behavior. In addition, observed positive parenting continued to predict later CU behavior (see Table 29). In other words, even when controlling for both earlier CU behavior and general externalizing problems, observed parental displays of warmth, proactiveness, and involvement appear to be important to development of CU behavior over one- and two-year periods. As such, the findings from Study 1 fit with previous studies that have found low levels of positive parenting are associated with increases in CU behavior over time (e.g., Hawes et al., 2011; Pardini et al., 2007).
5.2.4. Regression analyses (observed harsh and positive parenting)

Next, a series of hierarchical regression models were run to test the prediction of later CU behavior considering both observed positive and harsh parenting simultaneously in one model (see Table 30). In other words, models tested the effect of each, while controlling for the other. Indeed, while there is evidence that both parental harshness and positive behavior support contribute to the development of CU behavior, no previous studies have compared their unique effects using observed parenting measures in the same model (see 4.5.1 and Figure 8). Initially models were run only controlling for earlier CU behavior. The model predicting age 3 CU behavior from age 2 measures was significant ($R^2=.23, F(9,578) = 20.52, p < .001$). The final step adding the parenting measures was
significant ($\Delta R^2 = .02, p < .001$); age 2 observed positive parenting added unique variance ($\beta = -.13, p < .01$) and there was a trend to significance for observed harsh parenting to add unique variance ($\beta = .07, p < .10$). The model predicting age 4 CU behavior from age 2 measures was also significant ($R^2 = .19, F(9,534) = 14.90, p < .001$) and the final step adding the parenting measures was significant ($\Delta R^2 = .03, p < .001$). Both age 2 observed positive ($\beta = -.09, p < .05$) and harsh parenting ($\beta = .13, p < .01$) added unique variance to the model.

Finally, the model predicting age 4 CU behavior from age 3 measures was significant ($R^2 = .31, F(9,531) = 27.95, p < .001$) and the final step adding the parenting measures was significant ($\Delta R^2 = .01, p < .05$). There was a trend to significance for age 3 observed positive parenting to add unique variance to the model ($\beta = -.08, p = .06$) but the contribution of observed parental harshness was not significant. Finally, models were run again to test the effect of observed harsh and positive parenting on later CU behavior, but controlling for both earlier CU behavior and earlier externalizing behavior (CBCL). The broad pattern of findings was similar (see Table 30). Likewise, when a specific aggressive-oppositional measure was included in models instead of a general externalizing behavior measure (CBCL), the pattern of results was unchanged (results not shown for brevity).
Table 30: Longitudinal prediction of CU behavior by both observed harsh and positive parenting, controlling for earlier child behavior

<table>
<thead>
<tr>
<th>predictors</th>
<th>CU behavior age 3 $R^2=.23, p &lt; .001$</th>
<th>CU behavior age 4 $R^2=.19, p &lt; .001$</th>
<th>CU behavior age 4 $R^2=.31, p &lt; .001$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ (SE) $\beta$</td>
<td>$B$ (SE) $\beta$</td>
<td>$B$ (SE) $\beta$</td>
</tr>
<tr>
<td>Age 2 CU behavior</td>
<td>.41 (.04) $^{***}$</td>
<td>.46 (.05) $^{***}$</td>
<td>.38 $^{**}$</td>
</tr>
<tr>
<td>Age 2 observed harsh parenting</td>
<td>.30 (.16) $^+$</td>
<td>-.77 (.23) $^{***}$</td>
<td>-.13$^{**}$</td>
</tr>
<tr>
<td>Age 2 observed positive parenting</td>
<td>-.33 (.10) $^{**}$</td>
<td>-.31 (.15) $^{**}$</td>
<td>-.09$^{*}$</td>
</tr>
<tr>
<td>Age 3 observed harsh parenting</td>
<td>.69 (.05) $^{***}$</td>
<td>$^{***}$</td>
<td>.06$^{ns}$</td>
</tr>
<tr>
<td>Age 3 observed positive parenting</td>
<td>-.26 (.13)</td>
<td>$^{*}$</td>
<td>-.08$^{†}$</td>
</tr>
</tbody>
</table>

Outcome of regression models

<table>
<thead>
<tr>
<th>predictors</th>
<th>CU behavior age 3 $R^2=.28, p &lt; .001$</th>
<th>CU behavior age 4 $R^2=.22, p &lt; .001$</th>
<th>CU behavior age 4 $R^2=.33, p &lt; .001$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ (SE) $\beta$</td>
<td>$B$ (SE) $\beta$</td>
<td>$B$ (SE) $\beta$</td>
</tr>
<tr>
<td>Age 2 CU behavior</td>
<td>.20 (.05) $^{***}$</td>
<td>.24 (.07) $^{***}$</td>
<td>.19$^{***}$</td>
</tr>
<tr>
<td>Age 2 observed harsh parenting (CBCL)</td>
<td>.09 (.01) $^{***}$</td>
<td>.09 (.02) $^{***}$</td>
<td>.24$^{***}$</td>
</tr>
<tr>
<td>Age 2 observed positive parenting</td>
<td>$.16 (.16) $^{*}$</td>
<td>$.60 (.23) $^{*}$</td>
<td>.10$^{*}$</td>
</tr>
<tr>
<td>Age 3 observed harsh parenting</td>
<td>.06 (.02) $^{**}$</td>
<td>.05$^{ns}$</td>
<td>.05$^{ns}$</td>
</tr>
<tr>
<td>Age 3 observed positive parenting</td>
<td>-.25 (.10)</td>
<td>-.27 (.14)</td>
<td>-.08$^{†}$</td>
</tr>
<tr>
<td></td>
<td>-.23 (.13) $^{†}$</td>
<td>$^{*}$</td>
<td>-.07$^{†}$</td>
</tr>
</tbody>
</table>

Intervention group, parent education, parent income and child race and gender included in step 1 of models, but not shown in table. $p < .10; ^* p < .05; ^{**} p < .01; ^{***} p < .001.$

5.3. Study 2: Do callous-unemotional behaviors moderate the association between parental warmth and harshness and the conduct problems of high-risk preschoolers?

Based on the extant literature (see Chapter 3), it was hypothesized that CU behavior would moderate the cross-sectional links between dimensions of parenting and conduct problems (indexed by Eyberg problem behavior factor), specifically that, (a) parental harshness (observed and parent-reported) would be more strongly positively related to child conduct problems in children with low levels of CU behavior at age 3, and (b) parental warmth
(coded from speech samples and parent-reported) would be more strongly negatively associated with conduct problems in children with high levels of CU behavior at age 3. The only two studies that have investigated moderation of the longitudinal association between parenting and conduct problems by CU behavior (Hyde et al., 2013; Pardini et al., 2007) found no significant effects of the CU behavior \( \times \) parenting interaction term on later conduct problems. As such, it was hypothesized that CU behavior in this study would not moderate the longitudinal prediction of later conduct problems by any of the affective dimensions of parenting.

5.3.1. Bivariate analyses

Bivariate correlations between the main Study 2 variables are presented in Table 31. As before, there were strong correlations between CU behavior and conduct problems (Eyberg), which are of a similar magnitude to associations between conduct problems and CU traits found in older samples of youth (Frick & White, 2008). In addition, there were modest-moderate correlations found between the parenting variables and both conduct problems and CU behavior. The small correlation between measures of parental harshness and warmth (parent-reported and observed) suggested that distinct aspects of parenting were being measured.
Table 31: Bivariate correlations between main variables in Study 2

<table>
<thead>
<tr>
<th></th>
<th>Observed harshness age 3</th>
<th>Parent-reported warmth age 3</th>
<th>Observed warmth age 3</th>
<th>CU behavior age 3</th>
<th>Conduct problems age 2</th>
<th>Conduct problems age 3</th>
<th>Conduct problems age 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent-reported harshness age 3</td>
<td>.19***</td>
<td>-.22***</td>
<td>-.11***</td>
<td>.35***</td>
<td>.15***</td>
<td>.36***</td>
<td>.34***</td>
</tr>
<tr>
<td>Observed harshness age 3</td>
<td>-.06ns</td>
<td>-.10</td>
<td>.21***</td>
<td>.05ns</td>
<td>.16***</td>
<td>.18***</td>
<td></td>
</tr>
<tr>
<td>Parent-reported warmth age 3</td>
<td>.26***</td>
<td>-.19***</td>
<td>-.09</td>
<td>-.16***</td>
<td>-.19***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observed warmth age 3</td>
<td>-.20***</td>
<td>-.06ns</td>
<td>.24***</td>
<td>.55***</td>
<td>.44***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CU behavior age 3</td>
<td></td>
<td></td>
<td></td>
<td>.42***</td>
<td></td>
<td>.35***</td>
<td></td>
</tr>
<tr>
<td>Conduct problems age 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct problems age 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.65***</td>
</tr>
</tbody>
</table>

Note. Conduct problems assessed via the Eyberg. *p < .05, **p < .01, ***p < .001.

5.3.2. Cross-sectional regression analyses (parent-reported measures)

Table 32 shows the results for the cross-sectional multiple regression analysis using the parent-reported measures of harshness and warmth. The total model explained 44% of variance in age 3 conduct problems ($R^2 = .44, p < .001$). CU behavior, earlier conduct problems, and parent reports of harsh parenting were all significant main effects in the model. In addition, CU behavior moderated the cross-sectional association between parent reports of warmth in the parent-child relationship and conduct problems at age 3 (interaction term, $\beta = -.09, p < .01$), which accounted for an additional 1% in the variance explained (for addition of both interaction terms $\Delta R^2 = .01, p < .05$). Post-hoc probing of this significant interaction effect revealed that parent reports of a positive and warm relationship were more strongly cross-sectionally associated with conduct problems for children with high ($\beta = -.17, p < .05$) versus low levels of CU behavior ($\beta = -.07ns$) (Figure 13). CU
behavior did not moderate the association between parent-reported harshness and conduct problems.

**Table 32: Regression analysis testing for moderation by CU behavior on the cross-sectional association between parent-reported parenting variables and conduct problems at age 3**

<table>
<thead>
<tr>
<th>Step</th>
<th>Independent variables</th>
<th>β</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Earlier (age 2) conduct problems</td>
<td>.29***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CU behavior</td>
<td>.42***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parent-reported harshness</td>
<td>.17***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parent-reported warmth</td>
<td>-.02ns</td>
<td>.43***</td>
</tr>
<tr>
<td>3.</td>
<td>CU behavior × parent-reported harshness</td>
<td>-.04ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CU behavior × parent-reported warmth</td>
<td>-.09**</td>
<td>.44***</td>
</tr>
</tbody>
</table>

*Note.* Conduct problems assessed via Eyberg. Covariates were entered in Step 1: intervention group, child gender, child race, parent education, and parent income. †p < .10; *p < .05; **p < .01; ***p < .001.

**Figure 13: Simple slopes of the cross-sectional association between parent reports of warmth and conduct problems at high versus low levels of CU behavior**

5.2.3. Cross-sectional regression analyses (observed/expressed measures)

Table 33 shows the results for the cross-sectional regression analysis with the observed/expressed parenting measures. The model explained 43% of variance in age 3
conduct problems ($R^2 = .43, p < .001$). Higher levels of CU behavior and lower levels of warmth were associated with more conduct problems. CU behavior significantly moderated the association between observed parental harshness and conduct problems ($\beta = .08, p < .05$), and the interaction term between expressed parental warmth and CU behavior showed a trend to significance ($\beta = -.06, p = .09$). Post-hoc probing of significant interaction effects revealed that observed harshness was more strongly associated with conduct problems in children with high ($\beta = .18, p < .05$) versus low levels of CU behavior ($\beta = .05 ns$) (Figure 14). Expressed parental warmth was marginally more strongly associated with fewer conduct problems in children with high ($\beta = -.18, p < .05$) versus low levels of CU behavior ($\beta = -.10, p < .01$) (Figure 14). All cross-sectional regression models were computed again without including age 2 conduct problems to assess the effect of controlling for baseline problem behavior. Results were similar to those reported (not shown for brevity).

**Table 33: Regression analysis testing for moderation by CU behavior on the cross-sectional association between parent-reported parenting variables and conduct problems at age 3**

<table>
<thead>
<tr>
<th>Step</th>
<th>Independent variables</th>
<th>$\beta$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Earlier (age 2) conduct problems</td>
<td>.31***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CU behavior</td>
<td>.44***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parent-reported harshness</td>
<td>.05ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parent-reported warmth</td>
<td>-.08*</td>
<td>.42***</td>
</tr>
<tr>
<td>3.</td>
<td>CU behavior × parent-reported harshness</td>
<td>.08*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CU behavior × parent-reported warmth</td>
<td>-.06†</td>
<td>.43***</td>
</tr>
</tbody>
</table>

*Note. Conduct problems assessed via Eyberg. Covariates entered in Step 1: intervention group, child gender, child race, parent education and income. *p < .10; † p < .05; **p < .01; ***p < .001.*
5.2.4. Longitudinal analyses (observed/expressed and parent-reported measures of parenting)

In the longitudinal analyses, hierarchical multiple regression was employed to test the prediction of age 4 conduct problems (assessed via Eyberg) by, (a) main effects of CU behavior and parenting at age 3, (b) interaction term, CU behavior × parenting at age 3, (c) earlier conduct problems, and, (d) covariates (as before). None of the models for any of the parenting measures (harsh or warmth, parent-reported or observed) featured significant
interaction terms between CU behavior and parenting. This result is in line with the two previous studies that investigated prediction of later conduct problems by an interaction term of CU behavior × parenting (Hyde et al., 2013; Pardini et al., 2007).

5.4. Study 3: Bidirectional associations between dimensions of parental warmth, callous-unemotional behaviors and conduct problems in high-risk preschoolers between ages 2-3

5.4.1. Bivariate analyses

First, bivariate correlations between all the variables included in Study 3 were computed (Table 34). Stability between each measure was moderate from ages 2-3 (range \( r = .32-.47, \) \( p < .001 \)). As expected, there were strong correlations between CU behavior and conduct problems (as indexed by the Eyberg Problem Factor) both cross-sectionally and longitudinally, suggesting that early manifestations of CU behavior appear to identify children with more severe emerging conduct problems (see Chapter 4, Figure 5). Correlations were also of a similar magnitude those found between conduct problems and CU traits found in older samples of youth (Frick & White, 2008). There were modest to moderate, significant cross-sectional and longitudinal correlations between the measures of parental warmth (expressed and observed) and child behavior (CU behavior and conduct problems; range \( r = .13-.22, p < .01 \)). In addition, age 2 measures of child behavior were correlated with age 3 measures of parental warmth, although these associations were of larger magnitude and more likely to be significant between CU behavior and parental warmth than between general conduct problems and parental warmth. Finally, bivariate cross-sectional associations between the different measures of parental warmth were
moderate (age 2, \( r = .22, p < .001 \); age 3, \( r = .21, p < .001 \)) suggesting they were assessing similar aspects of positive parental affective behavior.

Table 34: Bivariate correlations between main study variables in Study 3

<table>
<thead>
<tr>
<th></th>
<th>CU behavior age 2</th>
<th>CU behavior age 3</th>
<th>Conduct problems age 2</th>
<th>Conduct problems age 3</th>
<th>Expressed warmth age 2</th>
<th>Expressed warmth age 3</th>
<th>Observed warmth age 2</th>
<th>Observed warmth age 3</th>
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<tr>
<td>CU behavior age 3</td>
<td>.47***</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct problems age 2</td>
<td>.30***</td>
<td>.24***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct problems age 3</td>
<td>.28***</td>
<td>.55***</td>
<td>.42***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expressed warmth age 2</td>
<td>-.17***</td>
<td>-.18***</td>
<td>-.13***</td>
<td>-.13**</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Expressed warmth age 3</td>
<td>-.13**</td>
<td>-.21***</td>
<td>-.06ns</td>
<td>-.19***</td>
<td>.32***</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Observed warmth age 2</td>
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<td>-.15***</td>
<td>-.14**</td>
<td>.22***</td>
<td>.19***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observed warmth age 3</td>
<td>-.22***</td>
<td>-.25***</td>
<td>-.15***</td>
<td>-.15***</td>
<td>.17***</td>
<td>.21***</td>
<td>.47***</td>
<td></td>
</tr>
</tbody>
</table>

*Note. Conduct problems assessed via Eyberg. Note.* \( p < .05 \); \( ** p < .01 \); \( *** p < .001 \). Bold type indicates stability within measures from age 2-3.

5.4.2. Two way, cross-lagged, simultaneous effects models

Models 1 and 2 were two-way cross-lagged, simultaneous effects models to test associations between CU behavior and expressed versus observed parental warmth at ages 2 and 3, controlling for intervention group, child gender, child race, parent education, parent income, and whether the parent was the child’s biological parent (see theoretical model in Chapter 4, Figure 10). Standardized estimates of the cross-lagged pathways are presented in Table 35 (Models 1 and 2) and in Figure 15. For the model examining observed parental warmth, the fit was good, \( \chi^2(2, N = 731) = 2.26, p = .32 \); CFI = .99; TLI = .99; RMSEA = .01; SRMR = .01. The model fit for expressed parental warmth was also acceptable, \( \chi^2(2, N = 731) = .42, p = .81 \); CFI = 1.00; TLI = 1.00; RMSEA = .00; SRMR = .004. Results from both models indicated that parental warmth and CU behavior
demonstrated stability over time (range $\beta = .31-.44$, $p < .001$). For directly observed parental warmth, there were moderate effect sizes for the cross-lagged pathways indicating that parental warmth and CU behavior are reciprocally related over time ($\beta = -.11$, $p < .01$; $\beta = -.08$, $p < .05$). However, while expressed parental warmth predicted later CU behavior ($\beta = -.11$, $p < .01$) the cross-lagged effect did not reach significance ($\beta = -.08$, $p = .06$).

**Figure 15:** Standardized coefficients for cross-lagged and simultaneous effects pathways between parental warmth and CU behavior at ages 2 and 3 (Models 1 and 2)

---

5.4.3. Three-way, cross-lagged, simultaneous effects models

Models 3 and 4 were three-way cross-lagged, simultaneous effects models to test associations between CU behavior, expressed versus observed displays of parental warmth,
and conduct problems at ages 2 and 3. As before, both models controlled for intervention group, child gender, child race, parent education, income, and whether the parent was the child’s biological parent, (see theoretical model Chapter 4, Figure 10). Standardized estimates of the cross-lagged pathways are presented in Table 35 (Models 3 and 4) and in Figure 16.

**Figure 16: Standardized coefficients for cross-lagged and simultaneous effects pathways between parental warmth, child conduct problems, and child CU behavior at ages 2 and 3 (Models 3 and 4)**

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>.42***</td>
<td></td>
</tr>
<tr>
<td>-.17***</td>
<td></td>
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<td>-.13**</td>
<td></td>
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<tr>
<td>.30***</td>
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<td>.10*</td>
<td></td>
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<tr>
<td>.37***</td>
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<td>.49***</td>
<td></td>
</tr>
<tr>
<td>-.15***</td>
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<tr>
<td>-.16***</td>
<td></td>
</tr>
<tr>
<td>.30***</td>
<td></td>
</tr>
<tr>
<td>.12*</td>
<td></td>
</tr>
</tbody>
</table>

a) Standardized coefficients for cross-lagged and simultaneous effects pathways between expressed parental warmth, child conduct problems, and child CU behavior at ages 2 and 3
b) Standardized coefficients for cross-lagged and simultaneous effects pathways between observed parental warmth, child conduct problems, and child CU behavior at ages 2 and 3

For the model examining observed parental warmth, model fit was good, χ²(2, N = 731) = 2.26, p = .32; CFI = .99; TLI = .99; RMSEA = .01; SRMR = .01. The model fit for expressed parental warmth was acceptable, χ²(3, N = 731) = 2.49, p = .90; CFI = 1.00; TLI = 1.00; RMSEA = .00; SRMR = .01. All three variables showed stability over time (range β = .30-.40, p < .001). In both of the models, CU behavior and conduct problems (Eyberg) were always reciprocally associated with each other cross-sectionally and over time (range β = .10-.17, p < .001). For directly observed parental warmth, there were significant associations between parental warmth and CU behavior (β = -.10, p < .01) and there was a trend to significance for the cross-lagged pathway (β = -.07, p = .08). However, there was no significant effect of conduct problems on parental warmth, or parental warmth on conduct problems, when controlling for associations with CU behavior.

For expressed parental warmth, there was a significant association between parental warmth at age 2 and CU behavior at age 3 (β = -.10, p < .001) and a trend to significance for the cross-lagged effect of CU behavior on parental warmth. Expressed parental warmth
and conduct problems were not longitudinally predictive of each other, when controlling for concurrent associations with CU behavior. It is interesting to note that the estimates obtained for the expressed versus observed parental warmth were similar, despite significant differences in measurement approach. In addition, a similar pattern of findings emerged when the 8-item measure of aggressive oppositional behavior (from CBCL) was used, rather than a more general measure of early conduct problems. Finally, it worth noting that similar estimates were obtained in this study using the analytic strategy employed by Hawes et al. (2011) (see Chapter 3). Specifically, the effects of CU behavior on parental warmth, and parental warmth on CU behavior, controlling for earlier conduct problems, were similar whether tested in separate regression models or simultaneously in cross-lagged reciprocal effects models as outlined above.
Table 35: Standardized estimates of regression paths for models testing bidirectional associations between child behavior and expressed/directly observed parental warmth

<table>
<thead>
<tr>
<th>Models 1 and 2</th>
<th>Expressed parental warmth</th>
<th>Directly observed parental warmth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental warmth age 2 → Parental warmth age 3</td>
<td>.31***</td>
<td>.42***</td>
</tr>
<tr>
<td>CU behavior age 2 → CU behavior age 3</td>
<td>.45***</td>
<td>.44***</td>
</tr>
<tr>
<td>Parental warmth age 2 → CU behavior age 3</td>
<td>-.11**</td>
<td>-.11**</td>
</tr>
<tr>
<td>CU behavior age 2 → Parental warmth age 3</td>
<td>-.08, p = .06</td>
<td>-.08*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Models 3 and 4</th>
<th>Expressed parental warmth</th>
<th>Directly observed parental warmth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental warmth age 2 → Parental warmth age 3</td>
<td>.30***</td>
<td>.42***</td>
</tr>
<tr>
<td>CU behavior age 2 → CU behavior age 3</td>
<td>.42***</td>
<td>.41***</td>
</tr>
<tr>
<td>Conduct problems age 2 → Conduct problems age 3</td>
<td>.37***</td>
<td>.37***</td>
</tr>
<tr>
<td>Parental warmth age 2 → CU behavior age 3</td>
<td>-.10**</td>
<td>-.10**</td>
</tr>
<tr>
<td>Parental warmth age 2 → Conduct problems age 3</td>
<td>-.05ns</td>
<td>-.06ns</td>
</tr>
<tr>
<td>CU behavior age 2 → Parental warmth age 3</td>
<td>-.08, p = .07</td>
<td>-.07, p = .08</td>
</tr>
<tr>
<td>CU behavior age 2 → Conduct problems age 3</td>
<td>.17***</td>
<td>.17***</td>
</tr>
<tr>
<td>Conduct problems age 2 → Parental warmth age 3</td>
<td>.004ns</td>
<td>-.06ns</td>
</tr>
<tr>
<td>Conduct problems age 2 → CU behavior age 3</td>
<td>.10**</td>
<td>.10**</td>
</tr>
</tbody>
</table>

*Note.* Conduct problems assessed via Eyberg. *p < .05; **p < .01; ***p < .001. Income predicted warmth at age 3 and parental warmth at age 3, parent education predicted CU behavior at age 2, parent education predicted expressed parental warmth at age 3; in expected directions.

5.4. Study 4: Factor structure of the Inventory of Callous-Unemotional Traits at age 9

Confirmatory factor analysis (CFA) was employed to test which models applied by earlier researchers fit the data from parent reports on the ICU. Table 36 gives an overview of the models and fit indices reported in earlier studies and the current thesis for different factor solutions to enable comparability of findings. Model fit was evaluated using CFI, TLI, and RMSEA. For CFI and TLI, acceptable fit was defined using conventional definition of values between .90-.94, with values ≥ .95 taken to indicate good fit (Bentler, 1990; Hu & Bentler, 1999). RMSEA and SRMR values between .05-.10 were taken to indicate acceptable fit, and values of ≤ .05 to indicate good fit (McDonald & Hu, 2002). Internal
consistency of subscales was assessed using Cronbach’s alpha. Values of $\alpha \geq .80$ were considered adequate (Nunnally & Bernstein, 1994).

Table 36: Overview of confirmatory factor analyses from previous studies and current thesis of the Inventory of Callous-Unemotional traits (ICU; Frick, 2004)

<table>
<thead>
<tr>
<th>Model</th>
<th>$df$</th>
<th>$\chi^2$</th>
<th>SRMR</th>
<th>RMSEA</th>
<th>CFI</th>
<th>GFI</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Essau et al. (2006)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>2475.37</td>
<td>-</td>
<td>-</td>
<td>.73</td>
<td></td>
<td>1443 German</td>
</tr>
<tr>
<td>Model 2 (3-factor intercorrelated)</td>
<td>249</td>
<td>2214.17</td>
<td>-</td>
<td>-</td>
<td>.78</td>
<td></td>
<td>community</td>
</tr>
<tr>
<td>Model 3 (3-bifactor)</td>
<td>228</td>
<td>1824.94</td>
<td>-</td>
<td>-</td>
<td>.82</td>
<td></td>
<td>sample</td>
</tr>
<tr>
<td>Model 4 (3-bifactor with modification indices)</td>
<td>203</td>
<td>1034.46</td>
<td>-</td>
<td>-</td>
<td>.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kimonis et al. (2008b)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>890.76</td>
<td>-</td>
<td>.10</td>
<td>.50</td>
<td>-</td>
<td>248 American</td>
</tr>
<tr>
<td>Model 2 (original 4 factor hierarchical)</td>
<td>249</td>
<td>800.13</td>
<td>-</td>
<td>.10</td>
<td>.57</td>
<td>-</td>
<td>forensic</td>
</tr>
<tr>
<td>Model 3 (3-bifactor)</td>
<td>231</td>
<td>502.30</td>
<td>-</td>
<td>.07</td>
<td>.79</td>
<td>-</td>
<td>sample</td>
</tr>
<tr>
<td>Model 4 (3-factor hierarchical without items 2 &amp; 10)</td>
<td>206</td>
<td>471.25</td>
<td>-</td>
<td>.07</td>
<td>.79</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Model 5 (three BiFactor, without items 2 &amp; 10)</td>
<td>187</td>
<td>343.52</td>
<td>-</td>
<td>.06</td>
<td>.87</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Fanti et al. (2009)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>931.88</td>
<td>.09</td>
<td>.09</td>
<td>.57</td>
<td>-</td>
<td>347 Greek</td>
</tr>
<tr>
<td>Model 2 (3-factor intercorrelated)</td>
<td>249</td>
<td>722.77</td>
<td>.08</td>
<td>.08</td>
<td>.70</td>
<td>-</td>
<td>community</td>
</tr>
<tr>
<td>Model 3 (3-bifactor)</td>
<td>228</td>
<td>508.35</td>
<td>.06</td>
<td>.06</td>
<td>.82</td>
<td>-</td>
<td>sample</td>
</tr>
<tr>
<td>Model 4 (3-bifactor with modification indices)</td>
<td>212</td>
<td>372.12</td>
<td>.05</td>
<td>.05</td>
<td>.92</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Roose et al. (2010)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>2133.43</td>
<td>-</td>
<td>.13</td>
<td>.77</td>
<td>.72</td>
<td>455 Belgian</td>
</tr>
<tr>
<td>Model 2 (3-factor intercorrelated)</td>
<td>249</td>
<td>998.95</td>
<td>-</td>
<td>.08</td>
<td>.89</td>
<td>.85</td>
<td>community</td>
</tr>
<tr>
<td>Model 3 (3-bifactor)</td>
<td>228</td>
<td>674.53</td>
<td>-</td>
<td>.07</td>
<td>.92</td>
<td>.89</td>
<td>sample</td>
</tr>
<tr>
<td><strong>Feilhauer et al. (2012)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>1054.56</td>
<td>.09</td>
<td>.11</td>
<td>.78</td>
<td>.78</td>
<td>383 Dutch</td>
</tr>
<tr>
<td>Model 2 (3-factor intercorrelated)</td>
<td>249</td>
<td>846.64</td>
<td>.09</td>
<td>.09</td>
<td>.83</td>
<td>.83</td>
<td>mix of</td>
</tr>
<tr>
<td>Model 3 (3-factor hierarchical)</td>
<td>249</td>
<td>846.64</td>
<td>.09</td>
<td>.09</td>
<td>.83</td>
<td>.83</td>
<td>community,</td>
</tr>
<tr>
<td>Model 4 (3-bifactor)</td>
<td>228</td>
<td>706.73</td>
<td>.08</td>
<td>.08</td>
<td>.86</td>
<td>.86</td>
<td>mix of</td>
</tr>
<tr>
<td><strong>Ezpeleta et al. (2012)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>6706.3</td>
<td>-</td>
<td>.09</td>
<td>.77</td>
<td>-</td>
<td>622 Spanish</td>
</tr>
<tr>
<td>Model 2 (3-factor intercorrelated)</td>
<td>249</td>
<td>3670.3</td>
<td>-</td>
<td>.06</td>
<td>.89</td>
<td>-</td>
<td>preschool</td>
</tr>
<tr>
<td>Model 3 (3-bifactor)</td>
<td>228</td>
<td>2864.2</td>
<td>-</td>
<td>.05</td>
<td>.92</td>
<td>-</td>
<td>community</td>
</tr>
<tr>
<td><strong>Current thesis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1 (1-factor)</td>
<td>252</td>
<td>1816.93</td>
<td>-</td>
<td>.11</td>
<td>.83</td>
<td>-</td>
<td>541 American</td>
</tr>
<tr>
<td>Model 2 (3-factor intercorrelated)</td>
<td>249</td>
<td>1392.96</td>
<td>-</td>
<td>.09</td>
<td>.87</td>
<td>-</td>
<td>high risk</td>
</tr>
<tr>
<td>Model 3 (3-bifactor)</td>
<td>228</td>
<td>1057.89</td>
<td>-</td>
<td>.08</td>
<td>.91</td>
<td>-</td>
<td>preadolescents</td>
</tr>
<tr>
<td>Model 4 (3-bifactor with modification indices)</td>
<td>141</td>
<td>444.21</td>
<td>-</td>
<td>.06</td>
<td>.96</td>
<td>-</td>
<td>(age 9)</td>
</tr>
</tbody>
</table>
First, Model 1 was a unidimensional model. In line with previous studies, goodness-of-fit indices for this single factor model were poor ($\chi^2(252, N = 540) = 1816.93, p < .001; CFI = .83; TLI = .81; RMSEA = .11 (90\% CI = .10-.11)$) suggesting the existence of meaningful subscales. Second, Model 2 (3-factor, intercorrelated) showed improved model fit ($\chi^2(249, N = 540) = 1392.96, p < .001; CFI = .87; TLI = .86; RMSEA = .09 (90\% CI = .088-.097)$). With the exception of item 10, ‘does not let feelings control him/her’, all items showed acceptable ($> .40$) and significant factor loadings. In addition, the unemotional factor was significantly correlated with the uncaring ($r = .66, p < .001$) and callousness ($r = .55, p < .001$) factors, and the uncaring factor was significantly correlated with the callousness ($r = .81, p < .001$) factor. Third, Model 3 (three-Bifactor model; see Chapter 4, Figure 11) specified that all items load onto a general callous-unemotional dimension, as well as three uncorrelated subfactors. The three-Bifactor model fit the data better than the two previous models ($\chi^2(228, N = 540) = 1057.89, p < .001; CFI = .91; TLI = .89; RMSEA = .08 (90\% CI = .077-.087)$), but was not judged to be a satisfactory fit to the data (see Section 4.5.4). Furthermore, several parameters showed a sign opposite to that expected according to the item content or non-significant factor loadings of $< .40$.

Finally, for Model 4, the following items were deleted as they had low item-total correlations: item 8, ‘is concerned about the feelings of others’; item 10, ‘does not let feelings control him/her’; and item 15, ‘always tries his/her best’. In addition, modification indices were utilized and, after inspection of item content, correlation between the residuals of nine pairs of variables were specified: ‘does not like to put the time into doing things well’ with ‘does not care about doing things well’; ‘does not care about doing things well’ with ‘works hard on everything’; ‘does not seem to know "right" from "wrong"’ with ‘does not show emotions’; ‘seems cold and uncaring’ with ‘does not show emotions’; ‘seems cold
and uncaring’ with ‘hides feelings from others’; ‘works hard on everything’ with ‘does not like to put the time into doing things well’; ‘does not care about being on time’ with ‘does not like to put the time into doing things well’; ‘does not care about doing things well’ with ‘does not care about being on time’; ‘does not care about being on time’ with ‘works hard on everything’. Model 4 (Bifactor model including modification indices and removal of items 8, 10, and 15) showed good fit to the data: \( \chi^2(159, N = 540) = 444.21, p < .001; \) CFI = .96; TLI = .94; RMSEA = .06 (90% CI = .05-.06). The final model is shown in Figure 17 and the factor loadings summarized in Table 37.
Figure 17: Three-Bifactor model of Inventory of Callous Unemotional Traits (Frick, 2004)

Does not seem to know "right" from "wrong."
Does not care who s/he hurts to get what s/he wants
Does not care about being on time
Does not care if s/he is in trouble
Does not care about doing things well
Seems very cold and uncaring
Shows no remorse after doing something wrong
Does not like to put the time into doing things well
The feelings of others are unimportant to him/her

Is concerned about school work
Feels bad or guilty after doing something wrong

Easily admits to being wrong
Apologizes to persons s/he has hurt
Tries not to hurt others feelings
Works hard on everything
Does things to make others feel good

Expresses his/her feelings openly
Does not show emotions
It is easy to tell how s/he is feeling
Is very expressive and emotional
Hides his/her feelings from others

Note. Model fit statistics: $\chi^2(159, N = 540) = 444.21, p < .001; CFI=.96; TLI=.94; RMSEA=.06$
Table 37: Item loadings for the three-Bifactor structure of the Inventory of Callous Unemotional traits in a sample of preadolescent high-risk youth (N = 541)

<table>
<thead>
<tr>
<th>Item</th>
<th>Callousness</th>
<th>Uncaring</th>
<th>Unemotional</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not seem to know &quot;right&quot; from &quot;wrong.&quot;</td>
<td>.50***</td>
<td></td>
<td>.47***</td>
<td></td>
</tr>
<tr>
<td>Does not care who s/he hurts to get what s/he wants.</td>
<td>.51***</td>
<td>.55***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not care about being on time.</td>
<td>.26***</td>
<td>.32***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not care if s/he is in trouble.</td>
<td>.50***</td>
<td></td>
<td>.55***</td>
<td></td>
</tr>
<tr>
<td>Does not care about doing things well.</td>
<td>.40***</td>
<td>.46***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seem very cold and uncaring.</td>
<td>.50***</td>
<td></td>
<td>.56***</td>
<td></td>
</tr>
<tr>
<td>Shows no remorse when s/he has done something wrong.</td>
<td>.53***</td>
<td>.56***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not like to put the time into doing things well.</td>
<td>.35***</td>
<td>.35***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The feelings of others are unimportant to him/her.</td>
<td>.61***</td>
<td></td>
<td>.42***</td>
<td></td>
</tr>
<tr>
<td>Is concerned about school work.</td>
<td>-.12ns</td>
<td></td>
<td>-.43***</td>
<td></td>
</tr>
<tr>
<td>Feels bad or guilty after doing something wrong.</td>
<td>-.28**</td>
<td></td>
<td>-.70***</td>
<td></td>
</tr>
<tr>
<td>Easily admits to being wrong.</td>
<td>-.09ns</td>
<td></td>
<td>-.66***</td>
<td></td>
</tr>
<tr>
<td>Apologizes to persons s/he has hurt.</td>
<td>.05ns</td>
<td></td>
<td>-.84***</td>
<td></td>
</tr>
<tr>
<td>Tries not to hurt others feelings.</td>
<td>.20**</td>
<td></td>
<td>-.80***</td>
<td></td>
</tr>
<tr>
<td>Works hard on everything.</td>
<td>.24**</td>
<td></td>
<td>-.56***</td>
<td></td>
</tr>
<tr>
<td>Does things to make others feel good.</td>
<td>.33***</td>
<td></td>
<td>-.75***</td>
<td></td>
</tr>
<tr>
<td>Expresses his/her feelings openly.</td>
<td>.51***</td>
<td>-.43***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not show emotions.</td>
<td>-.44***</td>
<td></td>
<td>.47***</td>
<td></td>
</tr>
<tr>
<td>It is easy to tell how s/he is feeling.</td>
<td>.52***</td>
<td></td>
<td>-.57***</td>
<td></td>
</tr>
<tr>
<td>S/he is very expressive and emotional.</td>
<td>.42***</td>
<td></td>
<td>-.31***</td>
<td></td>
</tr>
<tr>
<td>Hides his/her feelings from others.</td>
<td>-.38***</td>
<td></td>
<td>.28***</td>
<td></td>
</tr>
</tbody>
</table>

†p < .10; *p < .05; **p < .01; ***p < .001.

The factor loadings for the ICU in this thesis for the three-Bifactor model demonstrate that variance in ICU score is accounted for by a general CU traits factor (Table 37). At the same time, and above and above the variance accounted for by a general factor, unique variance in ICU score is explained by three uncorrelated subfactors (callousness, uncaring, and unemotional; Table 37). The factor loadings in this thesis show some differences and similarities compared to the results of previous studies. First, the 21 items retained in the final model for the current thesis load well on the general factor, across the callousness, uncaring, and unemotional subscales. This finding contrasts with the results of...
previous studies, which have typically reported that the callousness and unemotional items load only slightly onto a general factor (e.g., Fanti et al., 2009; Kimonis et al., 2008b). The results of the current three-Bifactor model suggest that after accounting for unique variance accounted for by three separate subfactors, variance in score is also explained by a general CU traits factor. Second, in line with previous studies, the current results show that when controlling for the general factor, the item loadings for the uncaring factor appear to be low, and in some cases are non-significant or load in the opposite direction to item content.

Finally, the internal consistencies of subscales and CU traits general factor were computed for the revised 21 items and appeared comparable to previous findings. The internal consistencies of the three subscales, callousness ($\alpha$=.78), unemotional ($\alpha$=.65), uncaring ($\alpha$=.81), and total ICU scale ($\alpha$=.86) were acceptable, and good for the uncaring subscale and total CU traits scale. Similar to previous studies (e.g., Essau et al., 2006), the unemotional subscale showed lower internal consistency, although this could have been due to the small number of items ($n = 5$). The three-Bifactor model (with modification indices and removal of three items) and analysis of internal consistencies suggests that use of the general CU traits factor in future analyses (see Study 5) is justified. At the same time, given the acceptable internal consistencies of the subfactors and model fit, future analyses also needs to take place within a modeling framework that investigates prediction of a general CU traits factor, while taking into account separate subfactor scores (see Study 5).

Following analysis of factor structure, mean subscale and total ICU scores were computed based on the three-Bifactor solution. Descriptive statistics (including inter-subscale and subscale-total correlations) are presented in Table 38 for the whole sample, and are also shown split by gender. There were moderate correlations between subscales (range $r = .31-.50$, $p < .001$) and strong correlations between subscales with total ICU
score (range $r = .69-.88$, $p < .001$). Independent samples t-tests revealed a trend to significance for males to have a higher mean score than females for the total ICU scale ($M$, males=.86 versus $M$, females=.80, $t=-1.85$, $p=.07$) and a higher mean score on the uncaring subscale ($M$, males = 1.44 versus $M$, females = 1.35, $t=-1.75$, $p=.08$).

**Table 38: Descriptive statistics and bivariate correlations between mean scores for three subscales of ICU (callousness, uncaring, and unemotional) and total ICU scale**

<table>
<thead>
<tr>
<th>Male/female Unemotional subscale</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Whole sample</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Unemotional</th>
<th>Callousness</th>
<th>Total ICU score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncaring subscale</td>
<td>269/269</td>
<td>1.44/1.35</td>
<td>.64/.59</td>
<td>538</td>
<td>1.39</td>
<td>.62</td>
<td>.49***</td>
<td>.50***</td>
<td>.88***</td>
<td></td>
</tr>
<tr>
<td>Unemotional subscale</td>
<td>269/270</td>
<td>.92/.87</td>
<td>.52/.47</td>
<td>539</td>
<td>.89</td>
<td>.50</td>
<td>.31***</td>
<td>.69***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Callousness subscale</td>
<td>266/270</td>
<td>.39/.36</td>
<td>.40/.38</td>
<td>536</td>
<td>.37</td>
<td>.39</td>
<td>.77***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total ICU scale</td>
<td>266/267</td>
<td>.86/.80</td>
<td>.41/.37</td>
<td>533</td>
<td>.83</td>
<td>.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001.

5.5. Study 5: The influence of child behavior and parenting during the preschool years on the development of callous-unemotional traits at age 9

5.5.1. Bivariate correlations (within child measures)

First, bivariate correlations between study variables were computed. Specifically, bivariate correlations were computed between the four measures of child behaviors at 2-3 years old (CU behavior, conduct problems (Eyberg), externalizing behavior (CBCL), and aggressive-oppositionality; see Chapter 3, Section 3.3) and CU traits at age 9 (see Study 4). Bivariate correlations between child measures are shown in Table 39. Correlations between measures of child behavior at ages 2-3 are not shown, as these have been presented in earlier tables in this chapter. The bivariate analysis (note that the shared/partial effects of different measures of child behavior at ages 2-3 on CU traits at age 9 are tested in path models in the
next section) suggests that both CU behavior and general measures of behavior problems at ages 2-4 are moderately related to CU traits in middle childhood. At the same time, there is some suggestion from this bivariate analysis that CU behavior may be a stronger predictor of later displays of unemotionality and total ICU score than general problem behavior.

**Table 39: Bivariate correlations between child measures of problem behavior at ages 2-3 and CU traits at age 9 (both parent-reported)**

<table>
<thead>
<tr>
<th>Age 2</th>
<th>Age 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU behavior</td>
<td>.18***</td>
</tr>
<tr>
<td>Conduct problems (Eyberg)</td>
<td>.11**</td>
</tr>
<tr>
<td>Externalizing behavior (CBCL)</td>
<td>.16***</td>
</tr>
<tr>
<td>Aggressive-oppositional behavior</td>
<td>.18***</td>
</tr>
<tr>
<td>Age 3</td>
<td></td>
</tr>
<tr>
<td>CU behavior</td>
<td>.19***</td>
</tr>
<tr>
<td>Conduct problems (Eyberg)</td>
<td>.11*</td>
</tr>
<tr>
<td>Externalizing behavior (CBCL)</td>
<td>.10*</td>
</tr>
<tr>
<td>Aggressive-oppositional behavior</td>
<td>.12***</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001.

### 5.5.2. Bivariate correlations (parent and child measures)

Second, bivariate correlations between the various affective measures of parenting at ages 2-3 (observed harsh parenting, directly observed warmth, and expressed warmth) and parent-reported CU traits at age 9 were computed. Bivariate associations were computed for the associations between parenting and both subfactor (callousness, uncaring, and unemotional) and total ICU scores, and are shown in Table 40. (Note, correlations between parenting measures are not shown as they have been presented elsewhere throughout the results for Studies 1-3). With the exception of the observed harsh parenting measure at ages 2 and 3 and the expressed warmth measure at age 2, all the other observed and expressed measures of parenting were moderately correlated with total CU traits score at age 9 (range,
In addition, directly observed warmth at ages 2-3 was significant correlated with uncaring and unemotional scores at age 9 (range, $r=-.10-.18, p < .01$) but not with the callousness subscale. In contrast, expressed warmth at age 3 was significantly correlated with uncaring and callousness scores at age 9 ($r=-.22, p < .001$ and $r=-.11, p < .05$ respectively) but not with the unemotional subscale.

Table 40: Bivariate correlations between observed and expressed measures of parenting at ages 2-3 and parent-reported CU traits at age 9

<table>
<thead>
<tr>
<th></th>
<th>Uncaring subscale</th>
<th>Unemotional subscale</th>
<th>Callousness subscale</th>
<th>Total ICU score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed harsh parenting age 2</td>
<td>.70(ns)</td>
<td>.45(ns)</td>
<td>.09*</td>
<td>.09(ns)</td>
</tr>
<tr>
<td>Observed harsh parenting age 3</td>
<td>.04(ns)</td>
<td>.02(ns)</td>
<td>.05(ns)</td>
<td>.01(ns)</td>
</tr>
<tr>
<td>Directly observed warmth age 2</td>
<td>-.13**</td>
<td>-.10*</td>
<td>-.09(ns)</td>
<td>-.13**</td>
</tr>
<tr>
<td>Directly observed warmth age 3</td>
<td>-.14**</td>
<td>-.18**</td>
<td>-.07(ns)</td>
<td>-.15**</td>
</tr>
<tr>
<td>Expressed warmth age 2</td>
<td>-.05(ns)</td>
<td>-.07(ns)</td>
<td>-.05(ns)</td>
<td>-.06(ns)</td>
</tr>
<tr>
<td>Expressed warmth age 3</td>
<td>-.22***</td>
<td>-.09(ns)</td>
<td>-.11*</td>
<td>-.18***</td>
</tr>
</tbody>
</table>

$p < .05$, $p < .01$, $p < .001$.

5.5.3. Longitudinal path models

Third, three different models were specified that tested associations between parent-child affective interactions at ages 2-3 and the three subfactor and total factor scores of the ICU at age 9 (see Chapter 4, Figure 12 for theorized model). Three separate path models were specified that tested the prediction of CU traits at age 9 by longitudinal and reciprocal associations between child behavior and affective parenting at ages 2-3 for, (a) observed parental harshness, (b) expressed parental warmth, and (c) directly observed parental warmth. The three subfactors and general CU traits factor identified in the three-Bifactor model in Study 4 represent joint (but uncorrelated) outcomes. As such, models tested whether models that capture parental and child affective interactions at ages 2-3...
(controlling for their overlap) predict later displays of callousness, unemotionality, uncarining, and general CU traits at age 9.

For the model testing associations between child outcomes and observed parental harshness (Figure 18), a number of findings emerged. First, there were no direct associations between observed parental harshness at age 3 and any ICU subfactor scores or total ICU score at age 9 (which fits with the results from the bivariate analysis). However, controlling for overlap with conduct problems (Eyberg) and observed harsh parenting, CU behavior at age 3 uniquely predicted general CU traits at age 9 (i.e., total ICU score), callousness, uncarining, and unemotionality. Age 2 observed parental harshness predicted both CU behavior and conduct problems at age 3. Further, there were cross-sectional, reciprocal effects between CU behavior, parental harshness, and conduct problems at both ages 2 and 3. Standardized coefficients for paths between main study variable are presented in Table 41. (Note that the results were similar using a measure of conduct problems versus aggressive-oppositional behavior or externalizing behavior. For brevity, the table shows results from the conduct problems measure only).
Figure 18: Standardized coefficients for cross-lagged, simultaneous effects between parental harshness and child behavior at ages 2-3, and the prediction of child callous unemotional behavior at age 9

Note. Conduct problems assessed via Eyberg. *p < .05, **p < .01, ***p < .001. Note. Lower levels of parent education were associated with higher levels of child unemotional behavior at age 9, higher levels of observed parental harshness at ages 2 and 3, and higher levels of child CU behavior at age 2. Male gender was associated with higher levels of observed parental harshness at age 3 and more conduct problems at age 3. Finally, lower parental income was associated with higher levels of observed parental harshness at age 3.

The results from the model testing observed harshness suggest that harshness during the toddler years is associated with increases in CU behavior, which subsequently predicts higher CU traits in middle childhood. The fact that the model included a measure of problem behavior (e.g., conduct problems or aggressive-oppositionality) suggests that associations between parental harshness and child CU behavior develop over and above existing levels of problems behavior, thereby controlling for a severity effect. At the same, the associations between parental harshness, low income/parent education, and higher levels of child problem behavior at ages 2-3, suggests that even during the toddler years, some particularly troubled families may be stuck in cycles of coercive and harsh parenting.
and negative parent-child interactions that are difficult to get out of, and that have implications for future child development.

| Table 41: Standardized coefficients for cross-lagged, simultaneous effects between three measures of parental affective behavior and child behavior at ages 2-3, and subsequent prediction of child callous unemotional behavior at age 9 |
|-------------------------------------------------|---------------------------------|-----------------|
| Affective parenting measure 2 → Affective parenting measure age 3 | a) Observed parental harshness | b) Expressed parental warmth | c) Directly observed parental warmth |
| CU behavior age 2 → CU behavior age 3 | .21*** | .35*** | .33*** |
| Conduct problems age 2 → Conduct problems age 3 | .39*** | .40*** | .41*** |
| Affective parenting measure age 2 → CU behavior age 3 | .08 | -.09 | -.12*** |
| Affective parenting measure age 2 → Conduct problems age 3 | .10** | -.06ns | -.12** |
| CU behavior age 2 → Affective parenting measure age 3 | .06ns | -.06ns | -.12** |
| CU behavior age 2 → Conduct problems age 3 | .12** | .12** | .11** |
| Conduct problems age 2 → Affective parenting measure age 3 | .07ns | -.08ns | .05ns |
| Conduct problems age 2 → CU behavior age 3 | .21*** | .21*** | .22*** |
| Affective parenting measure age 3 → Total CU traits score age 9 | -.04ns | -.20*** | -.11* |
| Affective parenting measure age 3 → Uncaring age 9 | .01ns | -.23*** | -.09ns |
| Affective parenting measure age 3 → Callousness age 9 | .09ns | -.11 | -.05ns |
| Affective parenting measure age 3 → Unemotional age 9 | .01ns | -.13** | -.15ns |
| CU behavior age 3 → Total CU traits score age 9 | .29*** | .26*** | .26*** |
| CU behavior age 3 → Uncaring age 9 | .23*** | .20*** | .22*** |
| CU behavior age 3 → Callousness age 9 | .26*** | .23*** | .24*** |
| CU behavior age 3 → Unemotional age 9 | .19** | .18** | .17** |
| Conduct problems age 3 → Total CU traits score age 9 | .09ns | .03ns | .05ns |
| Conduct problems age 3 → Uncaring age 9 | .08ns | .03ns | .06ns |
| Conduct problems age 3 → Callousness age 9 | .09ns | .06ns | .07ns |
| Conduct problems age 3 → Unemotional age 9 | .01ns | .03ns | .03ns |

*Note. Conduct problems assessed via Eyberg. *p < .05, **p < .01, ***p < .001*

For the model testing associations between child outcomes and parental expressed warmth (Figure 19; Table 41), a number of interesting findings emerged. First, unlike the model testing parental harshness, expressed parental warmth at age 3 predicted general ICU
score, callousness, unemotionality and uncaring at age 9. As before, age 3 CU behavior predicted all age 9 outcomes, whereas general behavior problems (neither a measure of conduct problems, aggressive-oppositionality, nor externalizing behavior) was not a significant predictor. CU behavior, conduct problems, and expressed parental warmth were reciprocally related at ages 2 and 3. In addition, parental expressed warmth at age 2 uniquely predicted child CU behavior at age 3 (see Study 3). The model testing parental expressed warmth suggests important reciprocal longitudinal and concurrent effects between child affective behavior and parental warmth during toddlerhood, which are related to the subsequent development of CU traits in middle childhood.

Figure 19: Standardized coefficients for cross-lagged, simultaneous effects between parental expressed warmth and child behavior at ages 2-3, and the prediction of child callous unemotional behavior at age 9

Note. Conduct problems assessed via Eyberg. *p < .05, **p < .01, ***p < .001. Note. Lower levels of parent education were associated with higher levels of child unemotional behavior at age 9 and higher levels of CU behavior at age 2. Lower income was associated with lower levels of expressed warmth at ages 2 and 3. Male gender was associated with more conduct problems at age 2 and 3.
Finally, in the model testing the directly observed measure of warmth, there were some interesting significant pathways (see Figure 20). First, directly observed parental warmth at age 3 predicted only the general CU traits factor and unemotional subfactor at age 9. Second, as in Study 3, there were reciprocal and longitudinal cross-lagged effects between child CU behavior and observed warmth at ages 2-3. In addition, there were reciprocal longitudinal effects between child CU behavior and conduct problems. Further, conduct problems, CU behavior, and parental warmth were cross-sectionally related. Finally, child CU behavior at age 3 predicted all four CU traits outcomes at age 9, over and above conduct problems at age 3.

Figure 20: Standardized coefficients for cross-lagged, simultaneous effects between directly observed parental warmth and child behavior at ages 2-3, and the prediction of child callous unemotional behavior at age 9

Note. Conduct problems assessed via Eyberg. *p < .05, **p < .01, ***p < .001. Note. Lower income associated with lower directly observed parental warmth at ages 2 and 3. Non-Caucasian race was associated with lower levels of directly observed parental warmth at ages 2 and 3. Lower parent education was associated with lower observed parental warmth at age 2. Male gender was associated with more conduct problems at ages 2 and 3. Lower levels of parent education were associated with higher levels of child CU behavior at age 2.
Chapter 6: Discussion
6.1 Study 1: Do observed positive and harsh parenting predict callous-unemotional behaviors in preschool children?

6.1.1. Summary of findings

Study 1 advances current understanding of the development of CU behavior by prospectively analyzing the prediction of CU behavior in high-risk toddlers by both early observed harsh parenting and observed positive parenting. Limitations of previous studies included a reliance on parent reports of parenting and cross-sectional designs, with very few studies having prospectively assessed parenting, CU behavior, or their potential association, in young children. The findings from Study 1 provide support for the role of both early harsh and positive parenting in the development of CU behavior. The results are therefore consistent with previous studies that have demonstrated associations between negative parenting practices and CU trait development in older children (e.g., Fontaine et al., 2011; Pardini et al., 2007) and between dimensions of positive parenting and CU trait development in different samples of youth (e.g., Hawes et al., 2011; Pasalich et al., 2011b). In addition, the prospective design allowed for the inclusion of both earlier CU behavior and general problem behavior as controls in these models, strengthening the conclusions drawn about the effect of parenting.

First, the results suggest that displays of physical and verbal harshness (e.g., corporal punishment, shouting, or belittling) contribute to increases in child CU behavior over time, even after controlling for earlier CU behavior. These findings fit well with the theoretical proposals of Daversa (2010). Specifically, parents who demonstrate unemotional or harsh behavior, or who communicate their feelings poorly, may leave their
children unable to understand the perspectives or emotional demonstrations of others, and at greater risk for psychopathic-like behaviors.

Second, observed parental positive behavior support also appears to be important to children’s learning of behaviors relating to prosociality, empathy, and conscience. Specifically, low levels of positive parenting were associated with increases in CU features. Indeed, the cognitive and affective characteristics of children with high levels of CU traits include insensitivity to punishment and reward-driven aggression (Frick & White, 2008). The results of Study 1 support the notion that positive, reward-focused parenting is a theoretically salient target of investigation and fit with the results of previous studies that have found an association between positive dimensions of parenting and child CU traits (e.g., Frick et al., 2003a; Hawes et al., 2011; Pardini et al., 2007). Furthermore, parental warmth and positive affect have been found to predict conscience development in children showing fearlessness and punishment-insensitivity (e.g., Kochanska, 1997). Interestingly, the measure of observed positive behavior support assessed in Study 1 both focused on observed, active parenting behavior and incorporated aspects of parenting warmth. It may be that parental warmth and positive affect are most relevant to the construct of CU traits and related behaviors. As such, the observed positive behavior support measure developed for Study 1 may not have been sensitive enough to capture such specific associations (but see development of measures of positive parental affect, including direct observation of parental warmth in Sections 4.4.2 and 4.4.3; also see Studies 2 and 3).

While the results suggest that harsh and positive parenting relate to the early development of CU behavior, the contribution of parenting in both sets of models was modest, and both earlier CU behavior and externalizing behavior consistently and strongly predicted later CU behavior. Indeed, the effects of parenting were somewhat reduced once
models included externalizing behavior (or aggressive-oppositional behavior). Study 1 did not directly test this question, but it is theoretically intuitive that if a child is perceived as showing high levels of CU behavior, and is seen as fearless in response to punishment and non-compliant with directives, this may motivate a parent to use harsher punishment. Increasingly harsh parenting is thought to feed into cycles of mutual negative reinforcement, where both parent and child continually resort to coercion in their interactions (Patterson, 1982), and punishment severity and inconsistent parenting escalates (Dadds & Salmon, 2003). Likewise, a young child’s early displays of callousness and low affective responsivity, in combination with displays of aggressive or externalizing behavior, may undermine the positive affective quality of parent-child interactions. Future studies (see Study 3) are needed that assess cascade models of reciprocal influence between CU behaviors, emerging conduct problems, and parenting behaviors.

6.1.2. Strengths and limitations of Study 1

There are a number of strengths to Study 1, including the large sample size, the use of observed measures of parenting, and prospective, longitudinal measurement of CU behavior from toddler age. At the same time, the results should be interpreted in the context of several limitations. First, it is yet to be established how and whether the measure of CU behavior at ages 2-4 is prognostic of CU traits in middle childhood and adolescence. Studies 4 and 5 of this thesis investigate the factor structure of a fuller measure of CU traits in the current sample. The use of this fuller measure of CU traits allows for the testing of the prognostic capability of earlier CU behaviors as opposed to the prognostic capability of conduct problems. At the same time, the results highlight the need for continued investigation into the extension of the construct of CU traits to very young children.
Specifically, while a variety of observational paradigms employed within the developmental literature suggest that preschool children demonstrate behaviors relating to the construct of CU traits (e.g., Kochanska et al., 2002), the internal consistency of the CU behavior measure was weak at age 2. Thus, aspects of CU behavior may be insufficiently developed to assess before age 3 (Hyde et al., 2013).

Second, it is difficult to assess the role of a parent’s distorted perceptions of their child. Specifically, parental distortions may influence how negatively a parent rates their child’s behavior, but may also be a key factor in defining parent-child interaction processes involving harsh parenting behaviors or low warmth. In both cases, these interactions might be underpinned by a shared genetic risk for low affective behavior or callousness. The issue of parental perceptions again highlights the need to assess early manifestations of CU behavior using methods independent of parent perceptions, including observational tasks and experimental paradigms (e.g., Kochanska et al., 2002; Svetlova et al., 2010). However, neither the use of observational paradigms to assess CU behavior nor the use of observed parenting measures addresses the possibility that associations between parenting and CU behavior development may be driven by a third, unobserved variable, such as genetic or temperamental risk. Third, the measures of positive parenting may have been limited by a focus on goal-directed parenting, which may explain the small contribution made by observed positive behavior support to models. Given these limitations, Study 1 suggests that future studies may benefit from testing associations between affectively-based, rather than goal-directed, measures of parenting and CU trait development during early and later childhood (see Studies 2, 3, and 5).
6.1.3. Conclusions

Study 1 examined the role of very early parenting in the development of CU behavior. Observed harsh and positive parenting were longitudinally associated with young children showing increases in level of CU behavior. The results provide some support for early interventions to target harsh parenting and increase positive behavior support, in order to prevent the development of child behaviors that seem reliably and strongly related to more severe concurrent and future conduct problems (Hyde et al., 2013). At the same time, given the modest effects of the parenting measures, the results highlight the need for future studies to examine child-driven effects, including the extent to which CU behaviors have a genetic basis, the role of temperamental factors, such as fearlessness, and the interaction of child-driven effects and temperamental factors with specific aspects of parenting (see Studies 2, 3 and 5).

6.2. Study 2: Do callous-unemotional behaviors moderate the association between parental warmth and harshness and the conduct problems of high-risk preschoolers?

6.2.1. Summary of findings

Study 2 examined the role of CU behavior in moderating cross-sectional and longitudinal associations between dimensions of parenting and conduct problems in a large, community sample of boys and girls from ages 2-4 years old. Previous studies that have investigated questions relating to associations between parenting and conduct problems, and that have adopted this design, are limited by a reliance on parent reports of parenting, small clinic-referred samples that are predominantly male, and samples with a wide age range. These limitations compromise the generalizability of findings. Based on the extant literature, it
was predicted that parental harshness would be more strongly cross-sectionally related to conduct problems at lower levels of CU behavior and that warmth would be more strongly cross-sectionally related to conduct problems at higher levels of CU behavior. No predictions were made about longitudinal associations. Study 2 therefore aimed to replicate the findings of Pasalich et al. (2011b), who had reported on this divergent pattern of findings in a cross-sectional design. Moreover, the findings from both the cross-sectional and longitudinal models could have important implications for our understanding of the malleability of the conduct problems of very young children with emerging CU behavior.

In addition, the results of Study 1 had suggested the possibility of interactive effects between parent and child behaviors, contributing to the development of more severe conduct problems in the toddler years. In line with studies identified in the systematic review (Chapter 3), adopting the ‘moderator’ design therefore appeared a useful avenue to enable comparability with findings of previous studies. The extension of this design to include longitudinal prediction of conduct problems, in addition to the use of observed measures of parenting, added to the novelty of Study 2.

6.2.2. Cross-sectional ‘moderator’ design

Contrary to the hypothesis, harsh and warm parenting were both more strongly cross-sectionally related to conduct problems in children showing higher levels of CU behavior. Thus, the findings for observed harsh parenting in this young, large sample of children show the opposite pattern to those of oft-cited previous studies (e.g., Oxford et al., 2003; Pasalich et al., 2011b; Wootton et al., 1997). Specifically, the interaction between observed harsh parenting and CU behavior was significant, and harshness was more strongly and cross-sectionally associated with conduct problems at high levels of CU behavior.
behavior. Two previous studies have also reported a similar pattern of findings to that found in this thesis. First, Yeh et al. found that child-reported negative parental affect was more strongly associated with proactive aggression in children with high levels of psychopathic traits. Second, Edens et al. (2008) found that harsh/inconsistent parental discipline (youth-reported) was associated with increased conduct problems for youth with high levels of the interpersonal features of psychopathy (although harsh/inconsistent discipline was more strongly associated with conduct problems for youth with low levels of affective deficits). It is interesting to note the pattern of findings in these two studies. No previous studies have differentiated between proactive and reactive aggression when adopting the ‘moderator design’ (Yeh et al., 2011) and it is unclear why parental negative affect might be related to proactive aggression for youth with high levels of CU traits. Future studies are therefore needed to examine differential associations between dimensions of parenting (including parental affect) and reactive versus proactive aggression. Further, the divergent and complex pattern of findings report by Edens and colleagues has received almost no attention in the literature. Future studies are therefore needed to examine the interpersonal versus affective deficits distinction and why or how this might relate to differential associations between parenting and conduct problems.

Overall, the evidence about the moderating effects of CU traits on parenting remains mixed at best (also see Chapter 3).

Further, the results reported in this thesis need careful interpretation. First, it may be that in this very young sample, the effects of observed displays of parental harshness are particularly important to the emerging conduct problems of children with early displays of callousness and low affective responsivity. Perhaps during toddlerhood, high levels of CU behavior identifies those children who are particularly vulnerable to the negative effects of
parental harshness but who at later ages, will manifest conduct problems that appear to be independent of parenting (see Chapter 3). Indeed, it may be that at younger ages, the transactional effects of negative interactions, or coercive parent-child exchanges are yet to become entrenched. However, at older ages, children with CU behavior may have become more insensitive to the effects of punishment or parental discipline. Second, it should be noted that the finding of a significant interaction was not replicated using a parent-reported measure of harshness. Despite these caveats, the findings still suggest that at young ages, parental harshness may be cross-sectionally related to conduct problems regardless of a child’s levels of early CU behavior. Indeed, in Study 1, observed harshness predicted increases in CU behavior from ages 2-4 over and above existing conduct problems and CU behavior. As such, the results from this large community sample challenge the notion that conduct problems of children with CU features appear to develop independently of parenting.

In the cross-sectional analyses, the findings for parental warmth replicate those of Pasalich et al. (2011b). Specifically, the interaction between parental warmth (both expressed and parent-reported) and CU behavior was significant. Parental warmth was more strongly cross-sectionally associated with fewer conduct problems in children with high levels of CU behavior. This finding supports the notion that mutually reciprocal, warm, and positive parent-child interactions may be particularly important for preventing further development of conduct problems in children with CU features (see Kochanska, 1995; 1997). It has been hypothesized that because children with CU behavior appear reward-focused, they may be particularly responsive to high parental involvement and warmth. Parent-child relationships that are characterized by positive affective interactions may help to prevent further manifestations of a fearless or punishment-insensitive
temperament that will later produce empathy or conscience deficits (e.g., Cornell & Frick, 2007; Kochanska, 1997).

6.2.3. Longitudinal ‘moderator’ design

It is important to consider, however, that CU behavior moderated neither the effect of parental harshness nor parental warmth on later conduct problems when these associations were considered in longitudinal models. While these results need to be interpreted with caution, it appears that in this very young sample, conduct problems are equally strongly predicted by earlier parenting for children with high versus low levels of CU behavior. This finding fits with two previous studies that have assessed longitudinal associations between parenting and conduct problems at high versus low levels of CU behavior (Hyde et al., 2013; Pardini et al., 2007). At the same time, it is difficult to interpret the findings of this type of ‘moderator’ design when the outcome is at a later time point (see Chapter 3). Specifically, moving from a cross-sectional to longitudinal moderation design raises questions about how to specify models. In particular, and in younger samples, there could be multiple possible hypotheses about the timing and nature of associations between parenting, CU behavior, and conduct problems, which may be reciprocally related to each other over time.

Second, because children with high levels of CU behavior, in this and other samples, typically have higher levels of conduct problems (see Hyde et al., 2013), the absence of a longitudinal association between parenting and conduct problems may emerge as a statistical artifact. Because there appears to be little variability within conduct problems for youth of different ages with high levels of CU behavior (i.e., a ceiling effect), it may appear that parenting does not predict conduct problems for this group (see Chapter
3). This notion is supported by the observation that, across models, CU behavior and externalizing behavior were strong predictors in models. Indeed, in some models included in Study 1 of this thesis, earlier externalizing behavior sometimes explained the greatest variance in later CU behavior.

Finally, at this very young age, CU and severe conduct problems appear to go hand in hand. The results of Study 2 also need to be considered carefully in light of the high-risk children assessed. Specifically, while the sample has elevated mean levels of behavior problems, it includes many children both with and without clinically discernible conduct problems. However, controlling for earlier/baseline conduct problems did not change the pattern of the results, which suggests that the associations found do not simply represent an effect of severity of conduct problems within this young, high-risk sample. At the same time, the complexity and likely reciprocity of any associations between different dimensions of parenting, CU behavior, and conduct problems across different-aged and types of samples suggest that alternative designs are needed in future studies (see Study 3).

6.1.4. Strengths and limitations of Study 2

There are a number of strengths to Study 2, including the large sample size, the use of expressed and observed measures of parenting and prospective, and longitudinal measurement from toddler age. The use of observed, expressed, and parent-reported measures results in stronger conclusions, especially about associations found for parental warmth, given the similar pattern of results found in different models. At the same time, the results should be interpreted in the context of several limitations. First, as with Study 1, it is yet to be established whether this measure of CU behavior is prognostic of CU traits in middle childhood and adolescence (although see Study 5). Further, the use of cut-off scores
to create subgroups of youth with ‘high’ versus ‘low’ levels of CU behaviors has yet to be evaluated in older samples of children and adolescents, let alone in very young samples. As discussed above, however, the presence of ‘high’ levels of CU behaviors in the current sample certainly seems indicative of more severe early manifestations of conduct problems (see Hyde et al., 2013).

A second limitation of this study is that while the expressed measure of parental warmth was derived from global coding of speech samples, it was not based on direct observations of parental displays of behavior, relying instead on parent’s narratives about their relationship with their child. However, the FAARS measure was used in an attempt to replicate the findings of a previous study (Pasalich et al., 2011b), and it has been shown to relate to observed positive parental behavior during parent-child interactions (Waller et al., 2012a). Furthermore, because parental speech samples are coded based on global aspects of content, tone and affect, they provide a holistic view of a parent’s level of positive affect, feelings of warmth, and attributions about their child. Despite these strengths however, both measures of parental warmth are derived from parent reports at some level. This caveat suggests the need to investigate associations between parenting, CU behaviors, and conduct problems with various directly observed measures of warmth (see Study 3).

6.1.5. Conclusions

The results of Study 2 are novel, showing that in a large and very young sample of children at risk for school-age conduct problems, affective dimensions of parenting, both negative and positive, appear particularly important to children with high rather than low levels of CU behavior when associations are considered cross-sectionally. This effect was not accounted for by children’s prior levels of conduct problems. Although the effect sizes for
the interaction terms were small, it is noteworthy that they conflict with both the extant literature and commonly the cited hypotheses about the immutability of conduct problems for youth with high levels of CU traits (also see Chapter 3). Furthermore, CU behavior did not moderate longitudinal associations between affective dimensions of parenting and later conduct problems.

In sum, the results support interventions for emerging conduct problems that are tailored and flexible according to the level of a child’s CU behavior, with a particular focus on affective dimensions of parenting for children with high levels of CU behavior. At young ages, it appears that children with CU features would benefit from interventions that reduce parental harshness and simultaneously improve the positive affective quality of the parent-child relationship. Future studies are needed to investigate longitudinal associations between affective dimensions of parenting, CU behavior, and conduct problems. In particular, studies that employ cross-lagged and simultaneous effects models to examine longitudinal associations between affective dimensions of parenting and CU directly would be helpful, with particular attention to the specific developmental age period being studied (see Study 3).

### 6.3. Study 3: Bidirectional associations between dimensions of parental warmth, callous-unemotional behaviors and conduct problems in high-risk preschoolers between ages 2-3

#### 6.3.1. Summary of findings

Study 3 examined associations between emerging conduct problems and dimensions of parent and child CU behavior in a sample of high-risk preschool children using cross-
lagged, simultaneous effects models. Parental warmth was assessed using two methods: expressed warmth via global coding of a parental speech sample (Section 4.4.3) and directly observed warmth via observation of parental displays of warmth in the home (Section 4.4.4). The results suggest that parental warmth may be particularly important to the early emergence of CU behaviors, rather than conduct problems in general. There was also suggestion of evocative effects of CU behavior on later parental warmth, although this was not replicated across both measures of warmth.

First, in two-way models, reciprocal concurrent and longitudinal effects between CU behavior and parental warmth from age 2-3 were examined. Models demonstrated that regardless of measurement method, higher levels of parental warmth predicted decreases in CU behavior between ages 2-3. This is in keeping with other studies that have found that dimensions of positive parental affect, including positive parent-child relationship quality and parental warmth, are longitudinally associated with CU traits in older samples of children (e.g., Frick et al., 2003a; Pardini et al., 2007). In addition, child CU behavior was found to predict observed displays of parental warmth, but not expressed parental warmth. There was therefore some evidence of cross-lagged effects between parental warmth and early emergence of CU behaviors for one of the measures in Study 3.

Second, in three-way models, reciprocal concurrent and longitudinal effects between CU behavior, conduct problems, and parental warmth from age 2-3 were examined. Models demonstrated that regardless of the measurement approach, parental warmth uniquely predicted CU behavior. Yet, in simultaneous effects model, parental warmth did not predict conduct problems. The finding fits with previous cross-sectional and longitudinal studies using moderator designs (see Study 2), which suggests that dimensions of parental warmth may be particularly important in reducing the risk of the
conduct problems in children with high levels of CU behaviors (e.g., Kroneman et al., 2011; Pasalich et al., 2011b; Study 2 of thesis). Finally, child CU behavior predicted directly observed, but not expressed parental warmth one year later, controlling for conduct problems at both time points. Thus, there was some evidence of unique reciprocal cross-lagged effects between parental warmth and early emergence of CU behavior.

The findings of Study 3 of this thesis support a broader line of research that has examined unique cognitive, socioemotional and neurobiological characteristics of antisocial youth with high levels of CU behaviors. This subgroup of children are at risk of more severe forms of antisocial behavior and demonstrate deficits in their behavioral and emotional responsiveness to cues of punishment and the distress of others (e.g., Blair et al., 2001a, 2001b; Kimonis et al., 2006a; Kimonis, Frick, Muñoz, & Aucoin, 2008a). At the same time, children with high levels of CU behaviors appear to be particularly sensitive to cues of reward (e.g., Pardini et al., 2006). It has been proposed that a certain style of parenting, characterized by high levels of parental involvement and warmth, cooperation, and mutual positive affect between parent and child, could prevent early manifestations of a fearless or punishment-insensitive temperament resulting in empathy or conscience deficits (e.g., Cornell & Frick, 2007; Kochanksa, 1993; 1997). The results of Study 3 support the notion that parental warmth in toddlerhood may help to reduce early displays of CU behavior, which may simultaneously prevent a child developing more severe conduct problems.

It is interesting to note that after controlling for earlier and concurrent conduct problems, CU behavior predicted later observed displays of parental warmth. This finding suggests that the early emergence of affective deficits in toddlers, rather than conduct problems in general, may particularly undermine early positive affective interactions
between parent and child (Hawes et al., 2011). Taken in conjunction with the high heritability estimates obtained for CU behaviors and conduct problems (see Viding et al., 2005; 2008), there may be a particular subgroup of families at risk of low levels of positive affect and warmth. However, the result was not replicated for parental expressed warmth as coded from speech samples. This pattern of findings could reflect differences in what is assessed by the two measures. The observed measure captures aspects of parental behavior directly and may be more independent of the outcome of CU behavior, which is reported by parents. In contrast, the expressed measure assesses general feelings, attributions, and attitudes the parent has about the child (see Chapter 4, Section 4.4.3), which may reflect their displays of warmth, as well as their (potentially negative) perceptions of their child and reports of CU behavior. On one hand, it is therefore particularly interesting that child CU behavior predicted the more independent observed displays of warmth. Thus, the behavioral aspects of warmth in particular provide a potentially interesting target of intervention for the parents of toddlers at risk of conduct problems. On the other hand, the results obtained with the directly observed measure to be replicated and should be interpreted with caution.

6.3.2. Strengths and limitations of Study 3

The results from all four models should be considered in the light of several limitations. First, as with both Studies 1 and 2, it is yet to be established if the measure of CU behavior is prognostic of CU traits in later childhood and adolescence. Study 4 of this thesis examines the factor structure of a fuller measure of CU traits, and Study 5 assesses the prediction of this later measure of CU traits by earlier CU behavior in toddlerhood in combination with the models developed in Study 3. At the same time, replication of the
current findings in future studies that use alternative methods to assess CU behavior, including observational tasks or experimental paradigms (e.g., Kochanska et al., 2002; Svetlova et al., 2010), or use of teacher reports, would strengthen the conclusions that can be drawn about associations between CU behavior and dimensions of parental warmth.

Second, parents reported on both CU behavior and conduct problems. One on hand, this may be problematic because distorted parental perceptions about their child could have resulted in over-reporting of negative aspects of child behavior while simultaneously reducing displays parental of warmth. This hypothetical link could account for the associations found. One the other hand, the differential prediction of parent-reported CU behavior versus parent-reported conduct problems by observed parental warmth suggests that the associations were not driven simply by parental negativity/low warmth affecting both their beliefs about the child and their parenting behavior. In other words, inclusion of conduct problems in models acted as a control for parental negative perceptions about their child.

6.3.3. Conclusions

Study 3 of this thesis is the first study to have examined concurrent and reciprocal associations between observed measures of parental warmth, CU behavior, and conduct problems over time. Results support the notion that aspects of the early, positive affective climate provided by parents appear to be uniquely and reciprocally related to CU behavior, over and above emerging conduct problems. The results provide support for interventions that target dimensions of parental warmth and parental affective beliefs and feelings about their child to prevent development of more severe and chronic forms of antisocial behavior. The results also highlight the potential importance of evocative child-parent effects in
undermining the positive affective quality of parent-child interactions. Interventions in early childhood that target children’s early socioemotional processing and empathic concerns both directly and via changes in parenting behavior, are likely to be a key target of future research to reduce development of severe conduct problems.

6.4. Study 4: Factor structure of the Inventory of Callous-Unemotional Traits at age 9

A significant body of research accumulated over many decades has focused on the affective features of psychopathy in both adult and youth samples (i.e., CU traits). Low emotional responsivity, a lack of concern for others, and blunted affect appear to delineate a subgroup of individuals who show more severe chronic forms of aggression and antisocial behavior (e.g., Frick & White, 2008; Chapter 2). More recently, research has focused both on extending affective and interpersonal aspects of psychopathy to youth samples, and on trying to understand the development and stability of these characteristics from childhood into adolescence and adulthood. Within this context, the ICU was developed to provide a fuller and more precise measure of multiple aspects of the interpersonal and affective features of psychopathy in youth. Study 4 of this thesis extended the validation of the ICU from adolescent and emerging adult samples to a younger, ethnically diverse high risk sample of boys and girls, all assessed at age 9.

6.4.1. Summary of findings

Study 4 of this thesis represents the first time that the factor structure of the parent-report form of the ICU has been investigated in a sample of preadolescent children of the same age (9 years old). When taken in conjunction with the findings from other validation
studies, the results of Study 4 suggest that this scale is promising as an extended measure of
CU traits relative to the PCL:YV (Forth et al., 2003) and APSD (Frick & Hare, 2002) for
use in high risk samples of youth.

To investigate the factor structure of the ICU, a one-factor model, a three-factor
correlated model, a three-Bifactor model, and a three-Bifactor model with modification
indices were compared. Fit indices increased with each model, and the final three-Bifactor
model (incorporating modification indices and deletion of three items) showed good fit to
the data. The first factor (callousness) described a general callous attitude (e.g., ‘He/she
does not care about doing things well’); the second factor (uncaring) consisted of items
related to a lack of caring about one’s own performance and about others (e.g., ‘He/she
works hard on everything he/she does’—reverse scored); and the third factor (unemotional)
described a lack of emotional expression (‘He/she expresses his/her feelings openly’—
reverse scored).

Results from Study 4 of this thesis are thus broadly consistent with the factor
structure obtained previously in a German sample of adolescents (Essau et al., 2006),
American adolescent offenders (Kimonis et al., 2008b), Dutch adolescents from a
community sample (Roose et al., 2010), and Greek-Cypriot adolescents (Fanti et al., 2009).
That similar factors emerge in diverse samples of youth of different ages, using different
languages and different informants, supports this factor structure. Finally, as in previous
studies, results assessing the reliability individual subscales and total ICU were mixed.
Internal consistencies were acceptable for ICU total and for the uncaring and callousness
subscales, whereas the internal consistency of the unemotional subscale was below a level
considered acceptable (e.g., Nunnally & Bernstein, 1994).
6.4.2. Strengths and limitations of Study 4

The results of Study 4 need to be considered in light of several limitations. First, for the three-Bifactor model to reach acceptable fit to the data, three items had to be deleted. As such, further testing of the set of CU traits items at this age is required to evaluate whether this finding is sample dependent. However, previous studies have also found it necessary to remove item 10 (“he/she does not let his/her feelings control him/her”). A second concern as in previous studies, is the low internal consistency of the unemotional subscale. One explanation for the low alpha obtained could be related to the small number of items in this subscale \((n=5)\). Nevertheless, because of the centrality of affective/interpersonal deficits in defining core psychopathic features, the inclusion of additional items that assess unemotionality may be an important amendment to future versions of the ICU.

Third, after accounting for the item variance attributable to the general factor (where item loadings were high; >.70 in many cases), some items on the uncaring subfactor showed loadings of <.30, in the opposite direction to that expected by item content, or were non-significant. One of these items was ‘is concerned about school work’, which is indicative of a lack of concern about performance and not the feelings and emotions of others. As such, this item may not be as relevant to core interpersonal/affective deficits of psychopathy (see Chapter 2). At the same time, concern about schoolwork has been suggested as one of four items in a CU traits specifier for CD in the forthcoming DSM-5 (see Frick & Moffitt, 2010). This item requires further investigation, as its construct validity may be dependent on developmental period. Two other items (‘easily admits to being wrong’ and ‘apologizes to persons he/she has hurt’) also showed non-significant loadings of below .30 for the uncaring subfactor (although they both had high and
significant loadings on the general factor). Taken together, these results suggest that future revisions should aim to develop a more precise index of uncaring items (although this may be specific to parent-reported forms of the ICU at age 9).

Fourth, while there are 12 positively- and 12 negatively-worded items distributed across the total ICU scale, two of the subscales in the three-Bifactor structure were ultimately largely comprised of either positively-worded (uncaring) or negatively-worded (callousness) items. This finding is similar to the factor structures obtained in other studies. The variance explained by the three-Bifactor model may therefore be due to method variance rather than construct variance. At the same time, items making up the unemotional subscale comprised both positively- and negatively-worded content, although the combination of these items may further explain the low alpha obtained for this subscale. Nevertheless, future studies examining the ICU in this and other samples would benefit from incorporating alternative assessments of constructs related to ICU subfactors (e.g., use of APSD or PCL-R:YV scores). Similarly, use of alternative informants across different measurements would further reduce the risk that method variance alone accounts for the factor structure.

Following on from this recommendation, it is worth noting that it was not possible to fully evaluate construct validity of the factor and subfactor scores for the ICU obtained with this sample. Collection of teacher-, parent-, and child-reported data is ongoing in the current sample. Future studies will therefore be able to test the convergence of ICU scores with different reports of aggressive, delinquent, or conduct-disordered behavior across settings and informants. At the same time, differential prediction of subfactors in Study 5 by earlier affective measures of parenting versus child behavior serves to demonstrate some
construct validity for this factor structure (see Study 5; Chapter 5, Section 5.5; Chapter 6, Section 6.5).

However, Study 4 had a number of important strengths. The sample was moderate-large in size (N = 541) and included a large proportion of Black African-American, biracial, Caucasian, and other ethnic minority adolescents drawn from across urban, semi-urban, and rural settings thus increasing the generalizability of the findings. Further, taken in conjunction with the findings from studies that assessed clinic-referred or forensic samples, the results of Study 4 suggest that the ICU shows promise as a measure of CU traits across different types and ages of samples. As outlined in Chapter 2, CU traits constitute only one dimension of the construct of psychopathy. However, CU traits (i.e., interpersonal/affective features of psychopathy) appear to be the core deficit in this personality disturbance, and may be particularly important in differentiating within antisocial individuals (Frick & White, 2008; Muñoz & Frick, 2012). Further, assessing the level of CU traits appears to be a useful way of differentiating between children and adolescents, who may be at risk of developing more severe forms of antisocial behavior, or psychopathy.

6.4.3. Conclusions

Overall, results of the factor analysis found the best fitting model to be a three-Bifactor structure, replicating previous work in older samples drawn from multiple settings (including forensic/adjudicated adolescents, or clinic-referred youth). However, as has been shown in prior validation studies, fit statistics and reliability indices ranged from good to
only being acceptable (and even poor in some cases), suggesting the need for the refinement of this measure.

6.5. Study 5: The influence of child behavior and parenting during the preschool years on the development of callous-unemotional traits at age 9

6.5.1. Summary of findings

Study 5 significantly advances current understanding of the development of CU traits by prospectively analyzing the prediction of CU traits in 9-year-old children by early affective interactions between parent and child, assessed during toddlerhood. While previous studies have investigated prediction of CU traits by parenting, Study 5 of the current thesis is novel for a number of reasons. First, Study 5 is the first study to have assessed the 7-year stability of CU behaviors in children from ages 2-9 years old. Second, Study 5 is the first study to have incorporated multi-informant measures of parental positive and negative affect to test the unique prediction of later CU traits by parenting, over and above earlier displays of CU behavior and general conduct problems. The findings from Study 5 suggest that there is some stability in child CU behavior from ages 2-9, over and above general conduct problems. At the same time, the findings from Study 5 suggest that aspects of parental positive affect uniquely predict decreases in CU traits over time, after accounting for these child-driven effects. The prospective design, which allows for the inclusion of both earlier CU behavior and general problem behavior as controls in models, strengthens the conclusions that can be drawn about the effect of parental warmth on the development of CU traits in middle-childhood, and has important implications for intervention.

First, in the model testing observed parental harshness, there were concurrent, reciprocal associations between parental harshness, CU behavior, and conduct problems at
ages 2 and 3. In addition, observed parental harshness at age 2 predicted both CU behavior and conduct problems at age 3. However, after controlling for these associations during toddlerhood, only age 3 CU behavior predicted ICU total and subfactor scores at age 9. These findings highlight that there is stability in CU behaviors from toddlerhood into middle childhood, and in this case, over a six-year period. At the same time, the reciprocal associations between parental harshness and both CU behavior and conduct problems during the toddler years suggests that a negative and coercive style of parenting early in life may lay the foundation for future child-driven problem behavior. The results from the model testing observed parental harshness suggest that interventions, targeting parental displays of verbal harshness and corporal punishment at very young ages may reduce the likelihood that children will develop CU traits. In particular, children who display early affective deficits and unresponsiveness to punishment appear to even more susceptible to the effects of harsh parenting during the toddler years.

Second, in the model testing parental expressed warmth, a somewhat different pattern of results emerged. As with earlier models (and see Study 3), there were concurrent and longitudinal effects between expressed parental warmth, CU behavior, and conduct problems from ages 2-3. Expressed parental warmth at age 2 was also found to uniquely predict CU behavior at age 3. As in the previous model, CU behavior at age 3 was also found to predict both the general CU traits factor and subfactors, over and above earlier parenting and conduct problems. However, unlike observed parental harshness, expressed parental warmth at age 3 also predicted both general CU traits at age 9 and scores on all three subfactors. The strongest effects were in the prediction of total ICU score ($\beta=-.20$, $p < .001$) and the prediction of the uncaring subfactor ($\beta=-.23$, $p < .001$).
Third, in the model testing directly observed parental warmth, a somewhat different pattern of findings emerged. As with the two previous studies (and see Study 3), there were unique reciprocal and longitudinal effects between directly observed parental warmth and CU behavior at ages 2-3, over and above conduct problems. Specifically, observed parental warmth at age 2 predicted later reports of CU behavior at age 3. At the same time, parent reports of child CU behavior at age 2 predicted observations of parental displays of warmth in the home at age 3. In addition, controlling for the overlap between parental warmth, CU behavior, and conduct problems at ages 2 and 3, CU behavior at age 3 predicted ICU total score and all three subfactors scores at age 9. Finally, over and above stability in CU behavior, directly observed parental warmth predicted general CU traits and the unemotional subfactor score at age 9. It is interesting to note the differential prediction of ICU scores between observed and expressed parental warmth in these latter two models. Specifically, while expressed parental warmth predicted total ICU traits score and all three subfactor scores, expressed parental warmth only predicted total score and unemotional score.

There are some interesting implications from all three models. First, it appears that early displays of parental harshness are important to the development of CU behaviors in toddlerhood (also see Studies 1 and 2), which themselves predict further development of CU traits in middle-childhood. However, the effects of harsh parenting in toddlerhood do not extend to predicting later CU traits, over and above the associations found at young ages. It may be that there is something unique about the developmental timing of the associations. Specifically, the effects of parental physical and verbal harshness (e.g., corporal punishment, shouting, or belittling), which contribute to increases in child CU behaviors in the toddler years may be limited to this age period. Nevertheless, it appears
that parents who demonstrate unemotional or harsh behavior, or who communicate their feelings poorly, leave their children unable to understand the perspectives or emotional demonstrations of others, but also at greater risk of continuing to develop CU traits into middle-childhood.

Though observed parental harshness at age 3 did not directly predict ICU total and subfactor scores, the effects of parental harshness could continue to operate indirectly through child behavior from ages 3-6, although these interactions were not captured in Study 5. Indeed, a child who shows high levels of CU behavior in toddlerhood, and is seen as fearless in response to punishment and non-compliant with directives, may motivate their parent to use harsher punishment. Increasingly harsh parenting through childhood is likely to feed into cycles of mutual negative reinforcement, where both parent and child continually resort to coercion in their interactions (Patterson, 1982) and punishment severity and inconsistent parenting escalates (Dadds & Salmon, 2003). These negative interactions are likely to contribute to further desensitization of an already-fearless child to displays of physical or verbal harshness by a parent, leading to further increases in callousness or unemotional behavior. Future studies that examine cascade models, testing parenting and child behavior at multiple points from ages 2-9 years are needed to investigate these questions further. In particular, cascade models may be useful in pinpointing developmental differences in the timing of different associations between parenting, CU traits, and conduct problems. For example, the current thesis suggests that fearless and punishment-insensitive children may be more vulnerable to the effects of harsh parenting during the toddler years, which may lead to increases in conduct problems. At older ages, however, child-driven effects relating to general conduct problems may drive increasingly harsh parenting (and vice versa) but these associations may become somewhat
independent of CU features. A cascade model, which fully tests or captures these different associations at different developmental stages is an important future research question.

Second, the results from the latter two models of Study 5 highlight the importance of early positive emotional displays and affect from a parent to the development of child CU behaviors from ages 2-9. It appears that parental warmth, as indexed via direct observation and expressed emotion of a parent, may be particularly important for laying the neurobiological and behavioral foundation for key aspects of a child’s socioemotional functioning. In particular, it appears that low levels of warmth increase the likelihood of a child displaying CU behaviors in the toddler years. Further, parental warmth is directly related to higher levels of general CU traits and unemotional behavior at age 9, which was found to be over and above stability in child behavior and replicated across two methods of assessing warmth. This finding supports the notion that involvement and warmth, cooperation, and mutual positive affect between parent and child could prevent early manifestations of a fearless or punishment-insensitive temperament (i.e., CU behavior at ages 2-3) resulting in empathy or conscience deficits later in childhood (i.e., CU traits at age 9) (e.g., Cornell & Frick, 2007; Kochanksa, 1993; 1997).

Taken together, these results provide support for interventions that target dimensions of parental warmth and parental affective beliefs and feelings about their child in order to prevent further development of CU traits, and later, potentially more severe and chronic forms of antisocial behavior. The results also highlight the potential importance of evocative child-parent effects in undermining the positive affective quality of parent-child interactions, especially during the toddler years. Interventions in early childhood that target children’s early socioemotional processing and empathic concerns both directly and via
changes in parenting behavior should thus be a key target of future research to reduce development of more severe forms of antisocial behavior.

6.5.2. Strengths and limitations of Study 5

There are a number of strengths to Study 5, including the large sample size, the use of observed and expressed measures of parenting, and prospective, longitudinal measurement of CU behavior from toddler age. In addition, the assessment of CU traits at age 9 in the same sample (all the same age at each assessment point) represents the first time that any study has investigated the stability of CU behaviors across this age period. Indeed, previous studies in this thesis have acknowledged that it was not known whether the measure of CU behavior at ages 2-4 was prognostic of later CU traits. Study 5 suggests that it is. Specifically, CU behaviors at age 3 predicted CU traits at age 9 over and above child conduct problems, parenting measures, and demographic covariates. At the same time, the results of Study 5 should be interpreted in the context of several limitations.

First, there was some attrition in the sample size from baseline at age 2 (N = 731) to the age 9 assessments (n = 541). That being said, selective attrition analyses comparing age-2 study variables for participants retained versus attrited at age 9 revealed no significant differences with respect to project site, children’s race, ethnicity, or gender, children’s externalizing behavior, or intervention status. Second, the differential findings for the measures of observed versus expressed parental warmth require careful consideration. Specifically, while expressed parental warmth at age 3 predicted the general CU traits score and subfactor scores (callousness, uncaring, and unemotional), directly observed warmth only predicted general CU traits score and the unemotional subfactor. This pattern of findings could reflect actual differences in what is assessed by the two
measures. The observed measure captures aspects of parental behavior directly and may be more independent of the outcome of CU behavior, which is reported by parents. In contrast, the expressed measure assesses general feelings, attributions, and attitudes the parent has about the child (see Chapter 4, Section 4.4.3), which may reflect their displays of warmth, as well as their potentially negative perceptions of their child and reports of CU behavior in toddlerhood and CU traits at age 9. As such, the more consistent prediction of later CU traits by expressed parental warmth may have reflected shared method variance (parent report underpinned all measures in this model).

That being said, it is particularly interesting that the more independent observed displays of warmth uniquely predicted parent reports of general CU traits and child unemotional behavior (i.e., even after accounting for variance explained by the general CU traits factor). The items that comprised the observed parental warmth measure were: ‘parent responds verbally to child’, ‘parent’s voice conveys positive feelings towards child’, ‘parent caresses/kisses child at least once during visit’, ‘parent responds positively to praise offered by visitor to child’, ‘parent is warm and friendly’, ‘parent seems to enjoy parenting’, and ‘parent seemed accepting of child’. It is interesting to consider why these items would be differentially associated with child CU traits and unemotional behaviors over a six year period. One explanation centers on the development of a secure, reciprocally warm and mutually responsive parent-child relationship, which appears to be necessary for development of key socioemotional behaviors, including empathy, prosociality, caring for others, and conscience (Kochanska, 1997; Kochanska & Murray, 2000).

At the same time, these associations highlight a third limitation with Study 5. Specifically, a third, unobserved variable, in this case a shared genetic propensity for parent and child to show low warmth, callousness, or low empathic responding, could be
responsible for the associations found. As outlined in Chapter 2 (Section 2.6.2), there is strong evidence showing that children with conduct problems and CU traits demonstrate neurobiological dysfunction in areas of the brain relating to the processing of signals of punishment (both the distress/fear of others and negatively-reinforcing contingencies from the environment). In particular, antisocial youth with high levels of CU traits have been to have abnormal processing in the amygdala and vmPFC (c.f., Blair, 2006; Finger et al., 2008; Marsh et al., 2008). Further, it has been hypothesized that genetic predisposition underpins individual differences in amygdala and autonomic reactivity to signals of distress (Blair, 2003), emotion regulation, and ventromedial prefrontal cortex reactivity to cues of punishment and reward. In support of this notion, the conduct problems of children with high levels of CU traits appear to be highly heritable (Viding et al., 2005; Viding et al., 2008).

Thus, Study 5 is limited because the associations between low warmth in parent and child could partly be accounted for by shared genetically transmitted liability. Further, the association could reflect evocative correlations – the child’s lack of positive responding could evoke further lack of warmth from a parent. As such, Study 5 highlights the need for future studies to continue to investigate the extent to which CU behaviors have a genetic basis, the role of temperamental factors, such as fearlessness, and how these factors interact with specific aspects of parenting. Future studies that adopt non-genetically informative designs could control for parent psychopathy/antisocial behavior when examining associations between parental warmth and child CU traits. Thus, studies could evaluate the direct effect of parent behavior, over and above potential gene-environment correlations relating to shared liability for low warmth, unemotionality, or callousness between parent and child, on child behavior outcomes. For example, Loney et al. (2007b) found that
dysfunctional parenting practices fully mediated the association between maternal psychopathic traits and child CU traits in a representative sample. From an intervention perspective, it is encouraging that this study found that associations between maternal psychopathic traits and child CU traits were mediated through parenting, as it further supports the notion that changing parenting practices could reduce child behavior problems, even in genetically vulnerable families. The study was cross-sectional however, so it is difficult to draw conclusions about causality. Nevertheless, the design and the analytic strategy employed represent a useful model to build on in future studies. For example, future studies could adopt a prospective longitudinal design and examine maternal/paternal scores on the PCL-R (i.e., clinician-rated) and examine various (and potentially reciprocal) associations between parent psychopathy score, parenting behavior (observed or parent-reported) and child CU behavior/conduct problems. A next step from this kind of observational design would be to examine associations between parental psychopathic traits, parenting, and child outcomes in the context of an RCT of a parenting intervention.

Finally, Study 5 was not able to investigate how the development of CU traits was related to concurrent displays of antisocial, delinquent, or aggressive behavior as data collection for these measures are ongoing in the current sample. As outlined in Chapters 2 and 3, it is useful to consider how measures of interpersonal/affective deficits, relating to the adult construct of psychopathy, differ from general indicators of antisocial behavior. It is also likely to be theoretically important, to consider differential predictors of CU traits versus antisocial behavior. Future studies using the same sample would therefore benefit from incorporating concurrent measures of antisocial, aggressive, or delinquent behavior into models at age 9, and testing which aspects of parental affect emerge as significant predictors.
6.5.3. Conclusions

Despite these limitations, Study 5 significantly advances what is known about the development of CU traits among youth. First, building on Studies 1-3, Study 5 demonstrates that early parent-child affective interactions are related to the emergence and development of child CU behaviors and concurrent conduct problems during toddlerhood. Children with CU features have high co-occurring conduct problems, and appear to have experienced harsher and less warm parenting at ages 2-3. Second, Study 5 incorporates the three-Bifactor model tested in Study 4 and demonstrates that reciprocal affective interactions between parent and child in toddlerhood predict future displays of general CU traits, and controlling for variance in general CU traits, separate displays of callousness, unemotionality, and uncaring at age 9. As such, observed displays of parental harshness and warmth, and parental expressed warmth, appear to be important targets of intervention to reduce the development of child CU behaviors from ages 2-9.

6.6. Integration across Chapters 2-5

Drawing across the different chapters, and the significant range of methodological and analytic approaches adopted throughout this thesis, a number of similar themes emerge. These themes have important implications for future empirical and intervention studies, and are critically discussed below. Broadly, these different themes relate to, (a) measurement and conceptualizations of psychopathy/CU traits in youth, (b) parenting as a predictor of CU traits, (c) relationship between study design and findings, and (d) implications for interventions. Each of these different themes is also related to the identified strengths and limitations of this thesis, and has implications for future directions for this research.
6.6.1. Measurement of CU traits in youth

Across all chapters, a consistent picture of the conceptualization and measurement of CU traits in youth emerges. First, in Chapter 2, a narrative review examining evidence from studies that have extended the construct of psychopathy to youth samples (specifically, interpersonal/affective dimensions) highlighted the need to develop assessment methods that were separate to those used to assess antisocial behavior. In particular, the review examined the ongoing debate about the importance of antisocial or behavioral deviance items to measures of psychopathy in adults (e.g., Hare & Neumann, 2005, 2010; Skeem & Cooke, 2010a, 2010b). Broadly, models of psychopathy derived from factor analysis of the PCL-R have tended to find that personality features (including affective and interpersonal deficits) load separately from behavioral traits (including impulsivity, aggression, and history of criminality; see Figure 1). Drawing on this debate in the adult psychopathy literature, previous conceptualizations of antisocial behavior among youth, and developmental literature examining constructs related to the features of psychopathy, Chapter 2 highlighted the need to focus on early displays or precursors to the personality features of psychopathy, which have commonly been labeled as CU traits.

Second, Chapter 3 examined measurement and conceptualization of CU traits in a systematic review of 30 studies that assessed associations between CU traits and parenting. Within the review, five different study designs were identified that each addressed a different question relating to associations between parenting, CU traits, and antisocial behavior. Across the 30 studies and the five different designs, the range of different sample types (from community, to high risk, to aggressive, or incarcerated) highlighted the need for future studies to consider carefully the relationship between CU traits and antisocial behavior. In risk factor studies, there was a lack of consistency in whether studies
controlled for earlier CU traits, earlier conduct problems, or both earlier CU traits and earlier conduct problems, in models. In addition, there were a number of limitations to the included treatment and intervention studies, which made it difficult to tease apart how parenting was related to CU traits versus antisocial behavior. Specifically, when studies did not adopt an RCT design, there was a lack of consistency in how (or whether) initial levels of conduct problems or antisocial behavior were taken into account. As such, depending on analytic strategy or study design, it was not always clear whether CU traits were predictive of poorer treatment responsiveness, whether CU traits directly moderated the effectiveness of treatments, or whether youth with high CU traits simply had more severe/chronic antisocial behavior in the first place. Further, very few studies included in the review examined potential reciprocity between youth CU traits and antisocial behavior, or how youth behavior might be related to parenting over time. Cross-lagged panel models were identified as a useful analytic approach to test whether parenting was uniquely related to CU traits, controlling for the overlap between both parenting and antisocial behavior, and parenting and CU traits. As such, Chapter 3 also highlighted that across a range of different designs, future studies examining associations between parenting and CU traits need to incorporate, and carefully consider, a separate assessment of antisocial behavior/conduct problems.

Third, in Chapters 3 and 4, five different empirical studies sought to build on the conclusions of Chapters 2 and 3, and examine associations between parenting and CU traits in a number of different ways. In doing so, Studies 1-5 controlled for and examined reciprocal associations between CU traits and conduct problems adopting a variety of different study designs. From a measurement perspective, CU behaviors at ages 2-4 were shown to load separately to aggressive-oppositional behaviors (see Section 4.4.1).
Furthermore, after controlling for earlier conduct problems, models showed that CU behavior at age 3 predicted later CU trait total and subfactor (callousness, uncaring, and unemotional) scores. Within the risk factor questions, Studies 1-5 demonstrated that dimensions of harsh and positive parenting predicted increases in CU behavior over time during the toddler years, when controlling for earlier conduct problems (and therefore enabling a severity effect to be accounted for in models). In addition, when controlling for conduct problems, parental warmth was uniquely reciprocally associated with CU behaviors at ages 2-3, and predicted later CU traits at age 9. A key strength of the current thesis is that the high risk sample comprised children without any discernible behavior problems as well as those with clinical levels of externalizing or aggressive behavior. Unlike previous studies, which may have been limited by testing questions about associations between parenting and CU traits among incarcerated or forensic samples of youth, the studies in this thesis were able to adopt a dimensional approach and statistically control for concurrent conduct problems.

However, despite the ability of these studies to separate the measurement of conduct problems from emerging CU behavior and later CU traits, a key limitation surrounding measurement still arises. Specifically, all reports of child behavior came from parents, including CU behavior at ages 2-4, conduct problems/aggressive-oppositional behavior at ages 2-4, and CU traits at age 9. One on hand, when considering the associations between these different measures of child behavior, the problem of shared method variance is a salient one. Specifically, distorted or negative parental perceptions about their child could have resulted in over-reporting of all aspects of child behavior, therefore accounting for the associations found, in particular for CU behavior at age 3 predicting later age 9 CU traits. In addition, the negative beliefs held by parents about their children may also have
accounted for associations found between independent observations of parenting, including low levels of warmth and parent reports of child behavior. One the other hand, models suggest that there was differential prediction of parent-reported CU behavior versus parent-reported conduct problems by observed parental warmth. Furthermore, even controlling for earlier conduct problems, CU behavior at age 3 predicted CU traits at age 9. Taken together, these findings suggest that associations were not driven simply by parental negativity affecting their beliefs, perceptions, and reports of their child’s behavior. In other words, inclusion of conduct problems in models also acted as a control for potentially negative parental perceptions about their child.

Nevertheless, as highlighted in Chapter 2, future studies are also needed to examine alternative ways to assess CU behaviors in young children. A variety of observational and laboratory-based paradigms have been developed in related fields, including developmental literature examining related constructs, such as empathy, conscience, and guilt (e.g., Lewis et al., 1989; Kochanska & Aksan, 2006; Kochanska et al., 2010). In these tasks, children are typically observed responding to various structured tasks, including their internalization of rules, their readiness to ‘cheat’ in tasks when given the opportunity, their response to being induced to break the rules of a game, and their empathic response to parental or others’ distress.

More recently, studies have also begun to distinguish between ‘cognitive empathy’ (recognition or inferring of another person’s thoughts or feelings) and ‘affective empathy’ (the capacity for an individual to translate cognitive empathy into emotional sensitivity or emotionally resonate with the feelings of someone else – rather than just recognize them). It appears that youth with psychopathic traits have deficits in affective but not cognitive empathy (see Jones, Happé, Gilbert, Burnett, & Viding, 2010). In an alternative approach,
Decety (2010) distinguishes between ‘affective arousal’ (an innate, automatic response present from infancy), ‘emotional understanding’ (a more mature and inferential ability, that develops gradually throughout childhood), and ‘emotion regulation’ (the ability to regulate one’s own emotions, understand the emotions of others, and be able to behave in an emotionally contingent, sensitive, and sympathetic way to them). In this conceptualization, empathy comprises both bottom-up processing of automatic affective responses and top-down processing, whereby an individual’s motivations, intentions, and ability to self-regulate influence their empathic experience and subsequent reaction to others, including their sympathy or prosocial behavior (see Decety, 2007; Decety & Meyer, 2008; Eisenberg & Eggum, 2009). In trying to separate measurement of conduct problems/antisocial behavior from assessment of psychopathic features, focusing on these different components of empathy could be a useful avenue of future investigation. In particular, developing ways to assess individual differences in ‘affective arousal’ or ‘affective empathy’ in young children appears to be a key research priority.

Simultaneously, tasks are needed that examine children’s ability to cognitively/top-down process the meaning and intentions of another person, as these processes provide a further potential target of intervention.

Examination of how these different components of empathy interact in relation to CU traits or antisocial/aggressive behavior may help to inform developmental models of psychopathy. Having observational or laboratory paradigms to assess components of empathy, some of which may be autonomic/physiological responses, to corroborate or test the prediction of parent-, teacher-, or child-reports of behavior might help to minimize shared method variance in studies. Similarly, future studies are needed that investigate how individual differences in temperamentally-based factors that are conceptually similar to CU
behaviors or precursors to low empathy, for example fearlessness/low fear arousal and punishment insensitivity, relate to future behavior problems. Remaining clear about how conceptualizations of empathy or low temperamental fear relate to CU behaviors, and ultimately to the construct of psychopathy in adults is an important future theoretical and methodological priority.

6.6.2. The role of parenting in the development of CU traits

Across Chapter 2-5, a number of interesting findings emerged in relation to parenting as a predictor of the development of CU traits. Chapter 2 broadly focused on conceptualizations of psychopathy and CU traits across development. However, throughout its conceptualization, debate has consistently surrounded the importance of environmental influences to the development of psychopathy. This debate is reflected in the early writings of Cleckley, McCord and McCord, Bowlby, and in the more recent models of Blair and Hare. What is particularly striking is the notion in the literature that because adjudicated adolescent and adult samples of psychopaths demonstrate neurobiological dysfunction in various brain regions, psychopathy must be inherently the result of innate, dispositional, or genetically-determined factors. However, Chapter 3 highlights that despite a commonly-held belief in the literature that CU traits/psychopathic traits in youth develop independently of parenting influence, there is good evidence, from studies adopting a range of designs, which suggests that parenting is prospectively related to increases in CU traits over time. Furthermore, the empirical analyses in Studies 1-5 of this thesis (Chapter 4-5) demonstrate that harsh, proactive, and warm parental practices in toddlerhood are associated with increases in CU behaviors from 2-4 years old, over and above conduct problems. Finally, parental expressed and observed warmth predicted increases in CU traits
across a six-year period from age 3-9, over and above stability in child CU behaviors, and age 3 levels of conduct problems.

The results from across Chapters 2-5 require careful interpretation. Specifically, the findings precipitate the need for a bottom-up and developmental evaluation of how the emergence and development of CU behavior in children fits into a broader framework of research examining adult psychopathy. To that end, this section of the discussion draws on a wide range of literature, including an examination of how parenting might interact with the neurobiological underpinnings of constructs related to CU traits (e.g., fearlessness and empathy), the relevance of attachment theory, and the importance of parent-child relational processes (even if these are driven by shared genetic traits), to the development of psychopathy.

First, as reviewed in Chapter 2, there is increasing evidence to support the notion that neurobiological dysfunction underpins many of the behavioral, socioemotional, and cognitive deficits displayed by antisocial youth with CU traits (e.g., Blair et al., 2001a, 2001b, 2001c; Dadds et al., 2006a; Jones et al., 2010; Marsh et al., 2008). Given both the results of the systematic review in Chapter 3 and the empirical findings of Studies 1-5 that showed an association between parenting and CU traits, it is important for this thesis to examine a theoretical model of CU traits development that links these neurobiological, child-driven factors with external and parenting-driven influences.

At a child-driven level, individual differences in behaviors relating to the construct of CU traits, including empathy, guilt, prosociality, deception, and proactive aggression emerge very early in life (e.g., Hay, 2005; Hoffman, 2007; Kochanska & Aksan, 2006; see Chapter 2). It has been hypothesized that these behaviors in children are associated with both low fearful arousal (‘fearlessness’) in response to socialization or discipline efforts
and low emotional responsivity to others’ distress/fear, increasing the risk for further development of empathy and conscience deficits (see Blair, 2005; Kochanska, 1995; 1997; Kochanska et al., 2002; 2004). The heritability estimates reported for conduct problems of children with high levels of CU traits suggest that these temperamental differences may be underpinned by a genetic predisposition (e.g., Viding et al., 2005; Viding et al., 2008), which has been theorized to produce abnormal functioning of the amygdala and vmPFC (see Blair et al., 2006). Finally, the development of empathy and conscience from infancy has been separated into ‘affective arousal’, ‘emotional understanding’, and ‘emotion regulation’ (Decety, 2010). Drawing across these different empirical findings and theoretical notions, the development of child-driven CU traits can be synthesized in a theoretical model (Figure 21).
Figure 21: Hypothesized theoretical model showing child-driven cognitive and socioemotional deficits leading to CU traits
Based on the extant literature, the model in Figure 21 hypothesizes that a genetic predisposition is, at least in part, responsible for individual differences in brain regions involved in processing or paying attention to negative reinforcement cues from the environment. This processing or attentional deficit is likely to relate to both contingency-based learning cues and emotion-based cues from social interactions with others, such as fear or distress (see Blair, 2005; Blair et al., 2006; Kochanska et al., 2002). Dysfunction in these brain regions, and specifically the amygdala and vmPFC, is manifested through individual differences in temperament and emotional responsivity to the environment during infancy, which relates to the conceptualization of ‘affective arousal’ (Decety, 2010). From 2-4 years old, these differences in temperament manifest as behavioral differences. As Studies 1-5 show, individual differences in behaviors relating to both socioemotional processing (e.g., low emotional responsivity) and cognitive processing (e.g., punishment does not change behavior) differentiate children with more severe early-starting conduct problems. Over time, these behaviors may become more entrenched and ‘trait’ like. Indeed, as Study 5 shows, early displays of CU behavior are a strong predictor of age 9 CU traits, as well as individual subfactors scores (i.e., unemotionality, uncaring, and callousness).

However, this thesis is primarily concerned with the role of parenting in the development of CU traits. Indeed, in the systematic review (Chapter 3) and across Studies 1-5 of this thesis, parenting emerged as a significant predictor at different developmental points of the pathways theorized in Figure 21. Drawing across Chapters 2-5, a second model emerges, which incorporates different aspects of parental influence on child behavior, based on extant literature to date and the empirical analyses in this thesis (see Figure 22).
Figure 22: Hypothesized model showing parenting effects on development of CU traits throughout childhood

Parental harshness and neglect in infancy/toddler years interacts with and increases child insensitivity to punishment

Parent and child share genetic predisposition for dysfunction in amygdala or vmpFC

Attachment difficulties, lack of warmth, and low positive parental affect interacts with low child emotional responsivity

Low fearful arousal (‘fearlessness’) to ‘cognitive negative reinforcement cues’

Acute affective arousal

Low emotional responsivity to ‘socioemotional negative reinforcement cues’

Cognitive processing
- Reward-driven
- Short-term goals
- Punishment insensitive

Parental discipline efforts are ineffective, punishments may become harsher, parent feels negative towards child. Concurrent conduct problems may result in increasingly coercive exchanges

Child Behavioral Indicators

Emotion understanding

Socioemotional processing
- Unresponsive to others’ emotions
- Does not express feelings
- Low prosociality

Low emotional responsivity to ‘socioemotional negative reinforcement cues’

Socioemotional processing
- Unresponsive to others’ emotions
- Does not express feelings
- Low prosociality

Parent expresses low positive feelings about child, does not display warmth towards child, does not feel positive about the relationship

Lack of reciprocated warmth undermines further attempts at parental warmth.

Factors associated with CU traits
- Lack of guilt
- Lack of empathy
- Punishment does not change behavior
- Manipulative
- Lies
- Unempathetic
- Callous towards others
- Unresponsive to distress/fear in others

Emotion regulation

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In the model, there are a number of pathways shown between parent and child behavior, support for which is provided by the studies reviewed in Chapter 3, and the empirical analyses of Studies 1-5 (see pathways (a), (b), (c), and (d); parenting highlighted in grey). The other pathways shown are yet to be tested, but could be the focus of future empirical investigations. First, as the parent is the provider of the child’s genetic material, the hypothesis that they share genetic predisposition for neurobiological dysfunction in the brain structures relating to CU traits development seems intuitive. Further, this notion fits with the idea that ‘primary psychopathy’ is an inherited and stable personality style (see Chapter 2). However, while there is preliminary evidence suggesting a strong heritable component to the development of CU traits (e.g., Viding et al., 2005; 2008), there is a paucity of research examining associations between parent and child psychopathy features. This contrasts with the significant body of literature that has documented consistent intergenerational transmission of aggression within families (e.g., Dubow, Huesmann, & Boxer, 2003; Thornberry, Freeman-Gallant, & Lovegrove, 2003). In one exception, Loney, et al. (2007b) found a significant association between maternal and child CU traits, and between maternal and child interpersonal psychopathy features. Interestingly, associations were mediated via parent-reported hostility and dysfunction, suggesting in line with results from this thesis that parental socialization practices are important to the development of child psychopathic features (see Chapter 3).

Second, the left hand side of the model focuses on the role of harsh parenting. Specifically, it is proposed that early displays of parental harshness (including shouting, corporal punishment, neglect, or abuse) may, via a number of mechanisms and in conjunction with child low fearful arousal or fearlessness, lead to CU behaviors, including punishment insensitivity or uncaring. One potential and untested pathway relates to the
stress response system. Evidence suggests that significant early adversity or neglect leads to excessive activation of areas responsible for processing threat, including the amygdala, which may lead to lasting changes to the circuitry in the brain (e.g., Sotres-Bayon, Bush, & LeDoux, 2004). These changes might further inhibit the development of emotional understanding, self-regulation, and reward/punishment-based learning skills. Indeed, it has been argued that, ‘maternal care during infancy serves to ‘program’ behavioral responses to stress in the offspring’ (Caldji et al., 1998, p. 5335). Relatedly, it has also been proposed that parental harshness might initially lead to raised levels of aversive arousal in children with low fearful arousal/stress response. However, a state of aversive arousal may not enable children to successfully internalize parental discipline messages, such that long-term moral development is undermined (Maccoby & Martin, 1983; Kochanska, 1997).

A third pathway, that is not mutually exclusive to the other pathways described, involves the direct behavioral effects of parental harshness (see pathway (a) in the Figure 22) on child behavior. Evolutionary theorists suggest that the emergence of qualities that are conceptually related to CU traits may make it easier for an individual to adapt to their environment (see Glenn, Kurzban, & Raine, 2011). For example, low stress responsivity may be adaptive in stressful, high-risk, or aversive conditions. Specifically, CU behaviors become adaptive in helping an individual remain calm and vigilant from threat in the environment (e.g., parental abuse or neglect) and could work as a signaling handicap (i.e., by showing calm, the individual signals he/she is not scared) (Del Giudice, Ellis, & Shirtcliff, 2011; Glenn et al., 2011). Further, being insensitive to social cues from the environment may also help an individual gain resources from others in a high-risk environment, by enabling them to adopt an exploitative interpersonal style, or to be unaffected by social rejection/feelings of shame. There is some empirical support for the
notion that abuse or neglect in early childhood is associated with development of a psychopathic personality style. For example, in various retrospective analyses, childhood abuse and neglect appear to be reliably related to psychopathy in psychopathic prisoners (e.g., Marshall & Cooke, 1999), and predicts psychopathic traits in delinquent boys (Krischer & Sevecke, 2008). However, future studies are needed that adopt a prospective design, and follow individuals over a life-course to evaluate the effects of abuse and neglect on development of psychopathy.

In support of the notion that parental abuse and neglect are important to the development of psychopathy, the current thesis demonstrated that displays of parental harshness predicted increases in CU behaviors from 2-4 years, and that the conduct problems of children with high levels of CU behavior appeared to be more strongly related to the effects of harsh parenting during the toddler years. However, harsh parenting did not predict CU traits at age 9. As such, future studies are needed to examine whether harshness is important at specific developmental periods. Indeed, the notion that harsh parenting is only related to CU traits at a specific and early point of development fits with the findings of various ‘moderator’ studies with older samples of children and adolescents (see Chapter 3). Specifically, there may be a developmental stage by which time the behavior problems of youth with high levels of CU traits are entrenched, and as such, appear unrelated to further displays of parental harshness. However, while there may be short-term ‘advantages’ to developing insensitivity to the environment, the longer-term cost for individuals, especially if it involves a trajectory of antisocial or criminal behavior, is high. As such, if early manifestations of CU behaviors in the context of a high-risk environment are to be considered a form of ‘resilience’ or effective adaptation, then individuals with relatively ‘successful’ (i.e., not criminal or antisocial) life trajectories also need to be
identified through prospective longitudinal studies. Indeed, within a resiliency framework, identification of children with low emotional responsivity who do not manifest criminal or antisocial outcomes later in development could precipitate search for ‘protective’ factors. A final pathway between parental harshness and child CU behaviors relates to behavioral modeling. Specifically, children may develop CU behaviors from watching, imitating, and modeling the behavior of parents who themselves may be unemotional, callous in their dealings with others, or proactively aggressive to obtain reward (see Daversa, 2010).

Third, the right hand side of Figure 22 shows the interaction of parental warmth and positive parental affect with child CU behaviors. As with parental harshness, it seems likely that parent and child may share a genetic predisposition for low warmth or low affective responsivity. Further, as pathways (b), (c) and (d) indicate (all of which are supported by the empirical analyses in this thesis), there appear to be lasting reciprocal effects between low parental warmth and increased levels of child CU behavior during the toddler years, which extend to middle-childhood. The findings from this thesis therefore fit into a broader research focus on the affective quality of parent-child relationships in relation to the development of CU traits and child conduct problems (e.g., Hawes et al., 2011; Pardini et al., 2007; Pasalich et al., 2011b). More specifically, research has focused on the affective quality and emotional warmth of the parent-child relationship.

Across Chapters 2-5 of this thesis, summarized in Figure 22, it appears that certain families are at risk of poor parent-child relational processes. Generally, parental warmth, child responsiveness, and successful attachment are considered to constitute a reward system. Both parent and child are theorized to experience a close and mutually warm relationship process as pleasurable, such that positive affect become positively reinforcing (see MacDonald, 1992). As such, both parent and child should be motivated to be
reciprocally warm towards each other and maintain a positive emotionally-driven relationship. Secure attachment facilitates the engagement of infants in reciprocally positive interactions with their caregivers, which is likely to promote further displays of parental warmth. It is theoretically intuitive however, that if a parent, who is also genetically predisposed to be low in warmth/positive affect, finds attempts at warmth are not reciprocated, the frequency of their displays of warmth will decrease. Likewise, if an infant does not experience consistent warmth, responsiveness, and positive affective displays from a parent, the infant’s own positive emotional responsiveness to the parent may also decrease.

As with parental harshness, there is support for this hypothesis from animal models, which suggest that low quality maternal care in rats (i.e., ‘warmth’; low levels of maternal licking and grooming) alters the stress physiology and brain morphology of pups during critical early periods of development (Meaney, 2010). In children, it may be that experience of low warmth also has lasting neurobiological, as well as behavioral, effects. Secure attachment is thought to facilitate reciprocal exchange of emotions and further reinforce positive relational process between parent and child (Isabella & Belsky, 1991). Throughout toddlerhood, these positive reciprocal emotion exchanges are hypothesized to enable children to appreciate the feelings of others and develop empathic concern (i.e., as they move from ‘affective arousal’ to ‘emotion understanding’; Decety, 2010). This thesis supports the notion that the emergence of child CU behaviors and parental warmth/positive affective displays are uniquely related during the toddler years (e.g., Studies 3 and 5; pathways (b) and (c)), and that parental warmth predicts child CU traits six years later (Study 5; pathway (d)).
6.6.3. Relationship between study design and findings

It is clear from the systematic review (Chapter 3) that there are a range of designs that have been adopted by studies investigating associations between parenting, antisocial behavior, and CU traits. Further, the empirical analyses of this thesis (Studies 1-5) attempted to replicate, extend, and develop novel study designs in order to examine questions relating to associations between parenting, CU traits, and conduct problems. At the same time, there are various methodological considerations, which invariably define what the study design is, or which stem directly from the choice of study design. Further, the type of study design has implications for interpretation of findings and implications for future research and interventions.

First, sample type can define study design. In the case of the ‘moderator’ study design, there certainly seems to be an historical component attached to the use of this approach when testing questions about associations between parenting, CU traits, and conduct problems. Specifically, when the construct of CU traits was originally conceived as a downward extension of interpersonal and affective dimensions of psychopathy (e.g., Frick et al., 1994), the focus was invariably on clinic-referred or adjudicated older samples of youth, mirroring a focus in the adult literature on psychopathic versus non-psychopathic criminals (e.g., Hare, 2003). As such, the level of conduct problems/antisocial behavior was, by definition, high, and, in keeping with the adult literature, studies were focused on identifying the presence/absence of CU features. Since those early studies (e.g., Oxford et al., 2003; Wootton et al., 1997), the applications of CU traits to different samples have become more nuanced, as have conceptualizations of CU traits. In non-clinical, community, or high-risk samples, CU features (as with conduct problems) are less likely to be
conceived of as present/absent. As such, the utility of the ‘moderator’ design may be inherently limited and applicable only to clinic-referred or forensic samples over short time periods. Further, the use of cut-off scores using CU traits measures to define the presence/absence of psychopathic features may not be appropriate given the malleability and responsivity to CU traits to parenting practices. Indeed, the notion of CU traits as fixed contrasts with recent treatment studies that have reported significant reductions in CU traits even among adolescent forensic and adjudicated samples (e.g., Caldwell et al., 2006, Caldwell et al., 2007; White et al., 2012). Finally, the validity of a ‘high’ versus ‘low’ CU traits distinction within youth samples has not been thoroughly validated in empirical work. Indeed, studies that have investigated stability of subgroup membership (i.e., youth are classified as high or low at multiple assessment points) find significant fluctuations (e.g., Fontaine et al., 2011; Frick et al., 2003a), reinforcing the idea that CU features appear to be continuous, which needs to be reflected in measurement efforts.

Second, analytic strategy appears to be strongly related to study design. In cross-sectional designs, it is not be possible to infer causality. Notwithstanding this limitation, cross-sectional designs should not prohibit examination of associations between parenting, conduct problems, and CU traits via multiple analyses. For example, the ‘moderator’ design traditionally involves testing associations between parenting and conduct problems at high versus low levels of CU traits with conduct problems as the outcome in models (e.g., Oxford et al., 2003; Wootton et al., 1997). However, one study reviewed in Chapter 3 tested interactions between conduct problems and CU traits, with parenting as the outcome (Hipwell et al., 2007). Future studies could test associations between parenting and CU traits at high versus low levels of conduct problems (i.e., CU traits as the outcome), a potentially salient future design given the findings of Studies 2 and 3 of this thesis.
Likewise, in longitudinal designs, the analytic strategy should attempt to control for effects of earlier conduct problems and CU behaviors, and be as transparent as possible about the effects of controlling for each or both.

Third in treatment and intervention studies (as reviewed in Chapter 3), the design of the study and analytic strategy that it defines may directly affect findings. For example, a baseline index of antisocial behavior may have important implications for understanding how treatment uniquely affects CU features versus future antisocial behavior. If youth with high levels of CU traits manifest more severe forms of antisocial behavior, this needs to be controlled for in analyses, or findings will suggest that these youth benefit less from interventions (see Hawes & Dadds, 2005 versus White et al., 2012). Likewise, without a control group (i.e., if treatment/intervention studies are not an RCT design), it is difficult to be clear about the direct effects of treatment on behavior. As such, design of treatment studies needs to enable moderation or mediation analyses (or moderated-mediation), which may be an important mechanism to understand effectiveness and, in particular, how changes in parenting are related to decreases in antisocial behavior or CU traits over time (see Hyde et al., 2013; McDonald et al., 2011).

Finally, as outlined in previous sections (e.g., 6.6.1), measurement and study design go hand in hand, which impacts on the conclusions that can be drawn about study findings. Notably, sample type (i.e., clinic-referred, community, or adjudicated) may also impact on measurement in defining availability of different informants. If studies are able to adopt multi-informant measures, including observation of both parenting and child behavior, this may help to, (a) minimize the risk of shared method variance inflating the magnitude of associations found between parent and child behavior, and, (b) minimize the chances that a parent with low positive affect or potentially negative perceptions of their child displays
negative reporting bias about their child’s behavior. The review in Chapter 3 highlighted that future studies would benefit from incorporating multiple ratings of child behavior in a latent variable framework (e.g., Trentacosta et al., 2009). Further, the multi-method, multi-informant observed measures adopted in Studies 1-5 are a strength of this thesis, particularly in enabling replication of findings across different measurement approaches (e.g., for observed versus expressed warmth in Studies 3 and 5).

6.6.4. Implications for interventions

There are a number of implications for interventions suggested by the results of Chapter 3-5. First, the most important intervention implication that emerges from Chapter 3 is the consistent finding that CU traits are responsive to parenting practices. Further, CU traits appear to decrease in response to changes in parenting practices following intervention or treatment. This conclusion contrasts with much of the previous clinical ‘lore’ and descriptions of CU traits commonly found in the child/adolescent literature and in the adult psychopathy literature. The notion that CU traits are not malleable or not a viable target for treatment is potentially harmful to youth with antisocial behavior or conduct problems, and the thesis underscores that this message is not consistent with empirical findings. As outlined in Chapter 3, although several studies including one treatment study, have gained much attention and citations within this field, their results are not consistent with the greater weight of the literature (published more recently in larger, better-designed studies).

In particular, Hawes and Dadds (2005) is an oft-cited study (139 citations, March 2013), but the findings are not replicated by more recent studies. Further, the study is limited by having a small sample and non-RCT design. In contrast, in several recent studies, personalized or flexible treatments have been found to benefit antisocial youth (White,
2010; Kolko & Pardini, 2010) and reduce conduct problems in younger children (Hyde et al., 2013; McDonald et al., 2011) even when youth have high levels of CU traits. At the same time, future treatment or intervention studies that adopt an RCT design are needed to identify the aspects of parenting, which are most robustly related to decreases in antisocial behavior in the presence of CU traits, or to direct decreases in CU traits.

In combination with the empirical analyses in Studies 1-5 of this thesis, certain key aspects of parenting have emerged as particularly important in relation to the development of CU traits, which has important implications for intervention. Broadly, this thesis supports the notion that targeting the attachment and affective quality of the parent-child relationship may be beneficial to reduce emerging displays of CU behaviors during the toddler years, and further development of CU traits and conduct problems during childhood. It appears that parents of children with conduct problems and CU traits might need specific training to increase the warmth and sensitivity of parent-child interactions. Further, teaching parents to maximize children’s experience of the emotional aspects of social encounters may help promote empathy and prosociality, and help children inhibit displays of proactive aggression towards others.

For example, Dadds and Rhodes (2008) hypothesize that close physical proximity to a child with CU features, which allows direct eye contact, may help focus the child on salient emotional or moral aspects of a situation. This hypothesis has subsequently been developed into a novel intervention, featuring a task that forces reciprocal parent-child eye contact (Dadds et al., 2012). Other intervention approaches could also include parents using inductive reasoning to counter a child’s low ‘affective arousal’ (Decety, 2010), which may enable them to understanding their behavior in context even if they do not ‘feel’ that they have done anything wrong. However, given that expressed parental warmth was also
found to be predictive of child CU behaviors from ages 2-4 and age 9, interventions that help parents examine and change their own affective beliefs and attitudes about their child may also help to promote more positive parent-child emotional interactions.

Finally, it is also important to consider the need for interventions to target parental harshness in the context of their disciplinary or socialization techniques. During the toddler years, low fearful arousal may make it difficult for children to internalize messages about moral development or socialization, when these messages are delivered in the context of strategies based solely on punishment or discipline. Indeed, parental displays of harshness seem to increase children’s insensitivity to punishment and further escalate their conduct problems and CU behaviors during the toddler years (see Studies 1, 2, and 3; Figure 22). As such, interventions are needed that reduce displays of overtly harsh or coercive parenting practices, and promote discipline techniques, consistent with the reward-focused cognitive processing style of fearless children with emerging CU behaviors.

In this way, there is some significant overlap between the implications of this thesis for interventions and existing evidence-based treatments/intervention that target parenting behavior. For example, the Incredible Years program is a well-developed behavioral health intervention, which builds on the principles of social interaction learning theory (Patterson et al., 1992) and a significant body of research that has examined parent-child interactions and associations between different dimensions of parenting and child outcomes (e.g., Baumrind, 1991; Maccoby & Martin, 1983; Patterson, 1982). The Incredible Years program has been shown improve child outcomes via reductions in parental displays of harshness and physical discipline, increases in parents’ positive discipline efforts and improvement in parents’ social competence, supportiveness, and responsivity (e.g., Reid, Webster-Stratton, & Beauchaine, 2001; Webster-Stratton, 1998; Webster-Stratton, Reid, &
Hammond, 2004). The results of this thesis suggest that these same intervention principles could be applied to treating children with conduct disorder, even in the presence of high levels of CU traits. Indeed, several intervention/treatment studies reviewed in Chapter 3 highlighted that parent-focused interventions were as effective for children/adolescents with CU features (e.g., Hyde et al., 2013; Kolko et al., 2009; McDonald et al., 2011).

Further, McDonald et al. (2011) found that reductions in child CU traits were mediated by improvements in mothers’ harsh and inconsistent parenting.

However, more studies that adopt an RCT design are needed to continue to test different and complex questions about the effectiveness of parenting interventions in reducing harsh parenting, including, (a) whether parenting interventions are effective in reducing child conduct problems when children have CU features and whether the effects operate via reductions in harsh parenting/improvements in positive parenting, (b) whether the presence of CU features makes it harder for parents to change their own behavior (and which aspects of parenting moderate this, including parental psychopathic traits), and (c) whether parenting interventions directly reduce CU features in children with conduct problems (and which aspects of parenting mediate these reductions).

Thus, while parenting-focused interventions appear to show promise based on the few studies that have investigated their association with CU traits (Chapter 3), much more empirical work is needed in this area. Further, studies 1-5 of this thesis are useful in highlighting some potential targets of investigation within future intervention studies, including parental warmth and parental positive affective attitudes. However, a second message of this thesis is that children are important participants in potentially reducing the affective quality of parent-child interactions. Treatment approaches that directly target child behavior may therefore be effective when used in isolation or in combination with
parenting interventions. In addition, there are some key methodological and practical limitations to the use of interventions that focus solely on changing parenting behavior.

First, the setting in which interventions are implemented may prohibit the involvement of parents in the process of behavior change. Indeed, it is worth noting that the findings from this thesis, which use data drawn from a home-based parenting intervention program, are not generalizable across all settings. For example, among adjudicated adolescents or youth in forensic/incarcerated settings, where treatment may be most needed, interventions necessarily target youth behavior, as parents are not available. Indeed, treatment in correctional or juvenile justice facilities often involve working with adolescents who have previously proven difficult to manage, resistant to behavioral change, and who may show more severe forms of aggressive or antisocial behavior. Typically, treatment modalities in this context would therefore focus on youth interpersonal processes, social skill acquisition, and developing conventional social bonds to displace delinquent associations and activities (see Caldwell et al., 2006; 2007; Gottfredson & Hirschi, 1990; Laub & Sampson, 2004).

Second, even in settings that enable interventions to target parents, including high risk groups like the families assessed in this thesis, or among clinic-referred samples, there may be limitations associated with focusing solely on parent behavior. Specifically, parental engagement with intervention strategies may be limited and community-level interventions struggle to access the most vulnerable families. Indeed, in community settings, lack of parent engagement can result in only a small proportion of parents enrolling in interventions, very few attending regularly, low compliance with treatment components, and premature drop out (e.g., Axford, Lehtonen, Tobin, Kaoukji, & Berry, 2012; Baker, Arnold, & Meagher, 2011; Bumbarger & Perkins, 2012). In addition,
participation barriers (including lack of transport, need for childcare, or substance abuse) often prevent enrollment and retention of low-income or high-risk families, who are arguably most in need of services (e.g., Utting, Monteiro, & Ghate, 2007). Further, motivational and cognitive barriers to participating in services also undermine attempts to recruit the most vulnerable families into interventions that target parent behavior (see Miller & Rollnick, 2002; Nock & Ferriter, 2005). As such, interventions that directly target child behavior or emotional processing skills in universal settings, such as pre-school or school settings, may also be useful to effect behavior change without parental involvement (e.g., Denham, Bassett, & Zinsser, 2012; Durlak & Weissberg, 2005; Najaka, Gottfredson, & Wilson, 2001; Stoltz, van Londen, Dekovic, Orobio de Castro, & Prinzie, 2012; Wilson, Lipsey, & Derzon, 2003; Wilson & Lipsey, 2007).

Third, intervention studies for conduct problems that target parenting are yet to consider the importance of passive gene-environment correlations specifically in relation to the presence of CU traits (i.e., correlations between child behavior and the parenting environment because of a shared genetically transmitted liability) or evocative gene-environment correlations (i.e., child’s CU traits evoke poor parenting responses). As outlined in previous sections, and shown empirically in Studies 3 and 5, aspects of child behavior relating to CU traits appear to interact with similar traits in parents (see Figure 21). For example, parents may struggle to implement intervention strategies relating to greater use of reward, positive reinforcement, positive affect, or warmth towards their child (see Kimonis & Armstrong, 20126). While reciprocal associations between parenting behavior and youth CU features have recently begun to be a focus of observational studies

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6 Kimonis & Armstrong (2012) present a case study about treatment of a 5-year-old boy with severe disruptive behavior (conduct problems, attention-deficit/hyperactivity disorder) and pronounced CU traits using Parent–Child Interaction Therapy. Initially, the boy’s mother was ‘resistant to implementing the token system and expressed concerns that her son already ‘got enough rewards’ for behavior’.
(e.g., Studies 3 and 5 of this thesis; Muñoz et al., 2011), intervention studies have yet to test gene-environment correlations within study designs (see Chapter 3 and Figure 2f and 2g for suggested alternative study designs). Nevertheless, it is theoretically intuitive that interventions, which directly target child warmth, empathy, or moral sensitivity, may precipitate or facilitate parental behavioral change, enabling further positive reinforcement of both parent and child positive behavior. Interestingly, this thesis points to toddlerhood as a specific developmental stage when child affective arousal and emotional sensitivity could be targeted. However, other observational studies have highlighted that other aspects of youth behavior at different stages of development may help promote positive parent-child interactions, including parent-child communication (Pardini & Loeber, 2008), and youth disclosure to parents (Muñoz et al., 2011) during adolescence. However, in young children particularly, it may be that changing parenting behavior and parent attitudes might be the first, and necessary step in breaking reciprocal cycles of low positive affect between parent and child (see Webster-Stratton, 1998).

There are various youth-focused treatment approaches, which may be effective in reducing CU traits and aggressive behavior among antisocial youth, especially if implemented in conjunction with evidence-based parent training programs. First, it is noteworthy that youth with psychopathic features exhibit more severe forms of aggressive and antisocial behavior (e.g., Christian et al., 1997; Dadds et al., 2006b; Hawes & Dadds, 2005; Hyde et al., 2013; White et al., 2012). Often, it is assumed that displays of aggression follow downstream from the interpersonal and affective features of psychopathy (i.e., uncaring, unempathic, and lack of responsivity to others’ distress facilitates a dominantly proactive aggressive style of behavior; see Chapter 2). However, entrenched aggressive and antisocial behavior could also drive an increasingly callous and unemotional personality
style. Thus, interventions that target antisocial behavior in general could also have collateral or indirect effects on CU features. Specifically, interventions that seek to change youth’s cognitions regarding the value of aggressive strategies to gain reward could help to reduce displays of antisocial behavior even in the presence of high levels of CU traits. In addition, interventions for antisocial behavior that seek to increase positive behavior, incorporate social skills training, or employ anger management techniques could also help reduce CU features across different aged and type of samples. Finally, a recent study demonstrated that combining stimulus medication with behavioral therapy improved the conduct problems of children with high levels of CU traits (Waschbusch et al., 2007a).

Second, interventions that focus on directly targeting children’s affective perspective-taking skills, emotional awareness, or emotional responsivity may also help to reduce CU traits. Such interventions are predicated on increasing evidence supporting the notion that antisocial youth with high levels of CU traits have specific processing and attentional deficits in relation to emotional stimuli (see Figures 21 and 22; Blair et al., 2006). For example, clinic-referred boys with high levels of CU traits showed impaired recognition of fear when viewing emotional faces, but normal patterns of fear recognition when instructed to focus on the eye region (Dadds et al., 2006a; Dadds, El Masry, Wimalaweera, & Guastella, 2008). Further, boys with high levels of callous–unemotional traits showed impaired eye contact during free interaction and emotion discussions with attachment figures (Dadds, Jambrak, Pasalich, Hawes, & Brennan, 2011). As such, interventions that help youth to focus on the salient emotional aspects of different social situations via eye contact might be effective in reducing CU traits and antisocial behavior (see Dadds & Rhodes, 2008).

In a recent example of an intervention that adopts this approach, Dadds and
colleagues developed an ‘emotional engagement’ adjunct to a parent training intervention. The adjunct includes a parent–child interaction task featuring a short but emotionally intense encounter, for which reciprocated eye gaze is fundamental. In the task, the parent is asked to move close to the child, look the child in the eye and say, ‘I love you’ (Allen et al., 2012; Dadds et al., 2012). A second task is the ‘how do I feel task’. In this task, the parent shows an emotional expression and the child must guess what emotion they are showing. Overall, the emotional engagement adjunct of the intervention seeks to be a complement to parenting training, encourage eye contact between parent and child, improve the child’s ability to attend to emotional cues, and strengthen the parent-child relationship. Currently, the effectiveness of this intervention is being tested in a small (n = 12, aged 3-8 years old) pilot study (J. Allen, personal communication, March 2013). While still in its early stages, the example is exciting, because it shows the clinical promise of targeting both parent and child behavior, in an intervention that incorporates parent training and increases the overall positive emotional experience and potential reward felt by both parent and child.

6.7. Limitations of thesis

Individual limitations of Studies 1-5 are summarized in previous sections (6.1-6.5). Furthermore, the limitations of the systematic review (Chapter 3) are outlined in Section 3.4.2. Drawing across these limitations, it is important to recognize the questions that this thesis cannot (and does not) address, as well as several key methodological limitations. First, this thesis has speculated about the role of early temperamental factors relating to low fearful arousal and low ‘affective arousal’, both of which are theorized to be related to individual differences in neurobiological functioning. Future studies are needed to examine these questions. Specifically, prospective longitudinal designs are needed to test whether
very early individual differences in affective arousal, stress responsivity, or fearlessness (assessed using laboratory, or observational paradigms) predict future CU behaviors, low parental warmth, or interactive effects between CU behavior and parenting.

Second, and relatedly, the child measures in the empirical analyses of this thesis were derived from parent reports. As outlined in previous sections, this is potentially problematic given that the thesis sought to test associations between parenting behavior and child behavior. The negative beliefs that a parent holds about their child, which may not be an accurate reflection of the child’s true behavior, could nevertheless be responsible both for inflated negative reports of child behavior (i.e., high levels of CU features) and actual observed displays of parental harshness and low warmth. At the same time, an attempt to overcome this ‘negative bias’ effect in Studies 1-5 included controlling for parent reports of conduct problems or aggressive-oppositionality in models, which rarely changed the pattern of associations found. However, future studies are needed to develop creative ways to measure CU traits, possibly by combining ratings from multiple informants (e.g., Trentacosta et al., 2009) or developing laboratory-based or observational paradigms that index a child’s CU traits (see Section 6.6.1). Further, the use of a variety of different parenting measures (including multi-informant observational measures, coding of parental expressed emotion, and direct global coding of interactions in the home) was employed to corroborate findings across different assessment methods. At the same time, however, there was a strong correlation between parental warmth versus observed positive behavior support by parents in general. As such, future studies are needed to continue to examine different measurement approaches to address questions about associations between parenting, CU traits, and antisocial behavior.
Third, the current thesis was not able to test the extent to which a shared genetic predisposition for CU traits was responsible for the associations found between parent and child behavior. This limitation permeates the conclusions that can be drawn across all Chapters, including the systematic review of 30 studies in Chapter 3, and the empirical analyses of Studies 1-5 (Chapters 4-5). Thus, this thesis is limited because the associations found may simply reflect both passive and evocative gene-environment correlations. Future studies are needed to continue to examine ways to control for these correlations, even when genetically informative designs are not adopted. For example, in a recent study, Dadds et al., (2012) included a measure of fathers’ fearlessness, which was associated with child low eye contact, a theorized marker for CU traits. Assessing related constructs to CU traits in parents might therefore be one way to control for genetic confounds in models within prospective longitudinal designs. Alternatively, interventions that comprise multiple arms could also help to identify which aspects of parenting behavior versus general parental characteristics are related to increases in CU traits. For example, interventions could include parent training only versus a combination of parent training and empathy or social-skills training for parents. Finally, it is worth noting that even if associations between parent and child behavior are driven by shared genetic liability, key aspects of the environment and parent-child interactions can still be targeted and changed through intervention. Indeed, heritability should not be viewed as ruling out the potential for behavior change. Nevertheless, a future challenge for intervention or prevention research might be to identify non-stigmatizing ways to target genetically ‘at-risk’ families (i.e., young children who have an incarcerated parent or delinquent sibling) (also see Loney et al., 2007b).
A fourth limitation of the current thesis relates to the way in which contextual and demographic data was dealt with in models. Typically, models controlled for intervention status, child gender, child race, parent education, and parent income. Significant pathways between these demographic covariates and outcomes were noted, but not discussed. The most consistent predictors of outcomes across models were male gender, which was typically associated with higher levels of conduct problems and higher levels of observed parental harshness during the toddler years; low levels of parent education, which predicted lower parental warmth and child CU behavior at ages 2-3; and low parental income, which predicted observed warmth and harshness.

While the effects of these different covariates were reported, future studies are needed to examine more precisely how associations between parenting and child behavior may differ by level of parent education or income, or by child gender. For example, there is some suggestion in the literature that some of the core neurobiological, attentional, and socioemotional deficits associated with CU traits may be unique to boys. At the same time, this conclusion may largely have arisen because the majority of studies that have investigated cognitive and emotional processing in antisocial youth with CU traits have focused on clinic-referred or adjudicated samples of males. This thesis suggests that boys may present with more severe conduct problems during the toddler years, which may also be related to some differences in parent-child relational processes.

However, gender did not significantly predict differences in CU traits total score, or subfactor scores, by age 9. At the same time, there was a trend to significance for boys to have higher overall CU traits score and higher scores on the uncaring subfactor. However, in line with this thesis and studies that have solely assessed male samples (e.g., Pasalich et al., 2011b), Kroneman et al. (2011) reported that parental warmth was more strongly
associated with lower levels of conduct problems in girls with high levels of CU traits. These findings therefore suggest that similar parent-child processes may be at work in both girls and boys, which contributes to an outcome of high CU traits. Nevertheless, level of conduct problems, and type or severity of aggressive behaviors, may be important variables of difference between males and females, which could relate to subtle differences in trajectories of CU traits development. Thus, future studies are needed to examine further potential differences in displays of unemotional, uncaring, and callousness in boys versus girls.

The few times that parent education or income were related to variables in models are difficult to interpret. A significant number of the families assessed in this project have very low annual incomes, and experience multiple risk factors, including a range of family risk factors (e.g., maternal depression, substance use) and early child problem behavior. Thus, it is unclear whether the results of this thesis are generalizable to children from higher-income families with fewer risk factors. Furthermore, this thesis did not explicitly test how and whether income or education level interacted with parenting behavior, and its prediction of child CU traits or conduct problems. For example, low income might serve to directly undermine a parent’s ability to provide a warm, structured, and safe environment leading to increases in CU traits. As such, future studies of the association between parenting and CU traits need to find better ways to model the context in which parenting behavior occurs, rather than just statistically controlling for it. Furthermore, many other social and physical difficulties (aside from parenting behaviors) arise from and are correlated with low income and low levels of education, including maternal depression, violence (domestic and community-level), crowding, and relationship conflict, and poor emotional communication (Bradley & Corwyn, 2002; Conger et al., 1992; Duncan &
Brooks-Gunn, 1997; Grant et al., 2003). It is difficult to evaluate whether associations between low income/poverty with child outcomes are simply associations (i.e., operate through more proximal factors, such as parenting, thus overestimating the effects of poverty), or whether income or parent education represent important and direct causal factors.

6.8. Strengths of the thesis

Despite these limitations, the results reported in this thesis should be viewed in the context of several significant strengths of the research. First, this thesis significantly advances the literature by including a thorough, systematic review of studies that have tested associations between parenting, CU traits, and antisocial behavior in a variety of study designs, and across of range of samples. No previous review of this question existed, and the conclusions of the review were instrumental in guiding the analytic strategy of Studies 1-5 in this thesis and in challenging previously held notions in the literature about the malleability of CU traits. Specifically, the review demonstrated that dimensions of parenting are prospectively related to changes in CU traits. Further, the review highlighted that subgroups of youth with both high levels of CU traits and antisocial behavior also appear to have experienced negative parenting practices. Careful evaluation of the different study designs in the review led to subsequent testing of, (a) direct associations between parenting and CU traits in hierarchical regression models, (b) testing of a CU traits \times parenting ‘moderator’ design with conduct problems as the outcome, and (c) development of a novel, three-way reciprocal and concurrent effects model to examine associations between CU traits, parenting, and conduct problems simultaneously from ages 2-3.
Across the empirical analyses of this thesis, there were also a number of important strengths that significantly move the literature forward. First, the current thesis featured a careful development and empirical testing of a measure of CU behavior during the toddler years, which could be differentiated from a measure of aggressive-oppositionality. The separation of measurement of CU behavior from general conduct problems enabled the current thesis to uniquely control for the effects of parenting on one versus the other. This separation of CU behavior from conduct problems and the establishment of a unique effect of parental warmth on CU behavior have implications for future diagnostic approaches to antisocial behavior in both youth and adult samples. Specifically, there appears to be some significant benefit associated with isolating behavioral displays of aggression, externalizing behavior, and oppositional behavior, from more intrinsic or basic cognitive/socioemotional processes, including punishment sensitivity or affective responsivity. In relation to definitions of psychopathy in adults, further examination of measures such as the PCL-R, which conflate antisocial and interpersonal/affective deficit items, is needed. This thesis highlights the need to continue to develop more precise indices or assessment tools of the affective and interpersonal aspects of psychopathy (see Frick, 2004 and Study 4).

Second, this thesis examined the prospective association between CU behavior during toddlerhood and CU traits at age 9. No previous studies have examined the stability of CU features during this age period. Indeed, the ability to examine conceptually similar behaviors in the same children, all assessed at the same age, is a significant strength of this thesis. Furthermore, the prospective, longitudinal design, with assessment of both parenting and child CU behavior from age 2 is unique to this thesis. No previous studies have examined the prediction of CU behavior by observed parenting from such a young age. The results suggest that there is some stability in CU behaviors from ages 3-9, supporting its
utility and meaning as a construct across this period of development. The results also highlight the importance of affective parent-child interactions during the toddler years, to the development of children’s socioemotional and cognitive processing, and their subsequent displays of CU behavior. In addition, parental warmth assessed at age 3 predicted CU traits at age 9, over and above both earlier CU behavior and conduct problems. As outlined in Section 6.6.4, this finding is particularly exciting because it identifies a target for future intervention studies.

Third, the empirical analysis that tested whether parenting predicted CU traits was novel, because it featured a range of different assessment methods to measure parenting. Both parental harshness and positive parenting were assessed via multi-informant observed measures. In addition, this thesis compared the effects of a measure of parental expressed positive emotion/warmth with the effects of a measure of directly observed parental warmth on child CU behavior. The use of these different measurement approaches enables the current study to address many of the limitations of previous studies which have typically relied on the use of parent-reported data to assess parenting (see Chapter 3). Moreover, the use of multi-informant and multi-method observational data overcomes limitations associated with other observational methods, including social desirability effects, observer reactivity, and inadequate sampling of behavior.

Specifically, this thesis included observational measures of parenting, which comprised both micro-social analysis and macro-social global ratings of videotaped parent-child interactions during structured tasks in the home. In addition, independent assessors rated global, non-structured parent-child interactions following a ‘live’ home visit of 2-3 hours duration. Finally, coders also rated the affective quality of parental expressed emotions, recorded during five-minute speech samples. The use of the FAARS rating scale
of five-minute speech samples represents the first time that this approach has been used with parents of toddlers (see Waller et al., 2012a). Further, the use of affective rating of parental speech samples appears to hold clinical and research promise, as a ‘real world’ brief assessment of the emotional climate of the home. The use of the different assessment methods in this thesis strengthens the conclusions that can be drawn about the effect of parenting on CU behavior, as measures were holistic and multi-context, combining global and event data from independent methods and observers, and were drawn from across structured and non-structured tasks.

6.9. Future directions

Future research is needed to address the various limitations presented in relation to the current thesis and the literature as a whole. First, more research is needed to develop better conceptualizations, measurement of, and definitions for the construct of psychopathy across the life-course. A number of future directions have been alluded to throughout this thesis, including the need for studies to incorporate observational measures and laboratory-based paradigms to assess constructs that are strongly related to CU traits (including empathy, prosociality, and emotional responsivity). Future studies need to continue to delineate measurement of interpersonal/affective features of psychopathy from indicators of general antisocial behavior, criminality, and aggression to better understand their separate contributions to poor adult outcomes (see Skeem & Cooke, 2010a).

Second, future studies need to find better ways to account for passive and evocative gene-environment correlations, which could be responsible for driving or inflating associations between parent and child behavior. Various methods to address this limitation are possible even in studies that do not adopt a genetically informative design. For
example, studies could include measures of parental psychopathy (e.g., Loney et al., 2007b), measures of factors relating to CU traits, such as fearlessness or empathy (e.g., Dadds et al., 2012), or could target both parental socioemotional/cognitive processing and their parenting behavior in the context of multi-arm intervention trials. Relatedly, studies are needed that better examine the context in which parent-child interactions are taking place. Indeed, several studies included in the review (Chapter 3) highlighted that many children with high levels of conduct problems and CU traits grow up in chaotic and dysfunctional homes (see Enebrink et al., 2005; Fontaine et al., 2011). Future studies could seek to examine the effect of targeting a child’s broader environment, including key aspects of family functioning.

Third, future studies are needed to build on the empirical findings of this thesis and other studies, which have highlighted the importance of the positive affective quality of parent-child interactions to the development of CU traits. In this context, there appear to be a number of future intervention possibilities. For example, interventions that promote reciprocal parent-child eye contact in the context of a high intensity emotional interaction seem to hold clinical promise for children with concurrent conduct problems and high CU traits (e.g., Dadds et al., 2012). In addition, interventions that seek to target both youth socioemotional processing and cognitions relating to the value of aggressive strategies could be effective (see Pardini et al., 2003; Caldwell et al., 2007; Kolko & Pardini, 2010), especially if used in conjunction with parent-focused intervention strategies. The next step in treatment research is likely to involve multi-arm RCTs to dismantle effective interventions, examine whether specific aspects of interventions or targeting specific dimensions of parenting or child behavior work best for CU traits versus general antisocial behavior, and evaluate any reciprocal associations between these outcomes.
6.10. Conclusions

A large body of previous research has documented significant heterogeneity in the type, course, cause, and severity of youth antisocial behavior. In the last fifteen years, research has examined whether the presence or absence of CU traits can be used to identify an important subgroup of youth, whose antisocial behavior represent unique etiological processes. The aims of this thesis were (a) to examine conceptualizations of psychopathy across development, including its extension to youth samples; (b) to examine the existing evidence for an association between parenting, CU traits, and conduct problems across different types of samples, and incorporating a range of study designs; and (c) as guided by the background reviews, to test several empirical questions about associations between observed parenting practices and CU behavior development in a high risk sample from ages 2-9.

Taken together, the results of this thesis provide converging evidence that CU traits are a valid construct in younger-aged samples, although future studies are needed to develop improved measurement approaches. In addition, this thesis supports the notion that CU traits are malleable and responsive to parenting practices. In particular, CU traits appear to be reciprocally related to aspects of parental warmth in the toddler years. Further, observed displays of parental warmth also predict age 9 CU traits, and child unemotionality. At the same time, parental harshness also predicted increases in child CU behavior, although only during the toddler years.

The results of this thesis support the need for future studies to develop and refine specific strategies to help parents deal with a potentially emotionally unresponsive child who may be resistant to punishment. These strategies are likely to involve strengthening the
positive emotional bond between parenting and child, while simultaneously reducing particularly harsh yet likely ineffective forms of discipline. At the same time, the child-driven effects found across the studies in this thesis also highlight the need for interventions that directly target children’s socioemotional and cognitive processing. The toddler years (in particular ages 2-4) appear to be a critical time during which these positive emotional bonds are formed or neglected, with lasting effects for children’s CU features. Future research should focus on both targeted and universal early preventive interventions, perhaps involving refinement of family-focused programs, to reduce the development of more severe and chronic forms of antisocial behavior.
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